



State of Louisiana
Department of Environmental Quality



KATHLEEN BABINEAUX BLANCO
GOVERNOR

JAN 21 2005

MIKE D. McDANIEL, Ph.D.
SECRETARY

CERTIFIED MAIL 7003 2260 0000 5816 6406
RETURN RECEIPT REQUESTED

Mr. William P. Paul, P.E.
Senior Environmental Engineer
Motiva Enterprises, LLC
Post Office Box 37
Convent, LA 70723

Re: Request for Final Copies-Permit Renewal Application
Louisiana Refining Complex
Permit Renewal Application - P-0246
Biosludge Landfarm
AI #2719
St James Parish (PER19990005)

Dear Mr. Paul:

The Water and Waste Permits Division has completed its review of your April 2004 permit renewal application and your November 17, 2004 Response to NODs, submitted on your behalf by Providence Engineering and Environmental Group. These submittals are for renewal of Permit P-0246 to include an upgrade to the leachate collection system.

Please submit six (6) bound copies of the complete modified application incorporating all previously accepted revisions in appropriate sections. Upon receipt of these copies, a final review will be conducted in order to ensure that the document is acceptable for public review. Your updated document shall be sent to this office within thirty (30) days of receipt of this letter. If upon this review, the document is determined to be technically complete, you will be notified of this decision and the public review period will be scheduled.

Please reference your Agency Interest Number (AI 2719), Facility Identification Number (GD-093-1513), and Permit Number (P-0246) on all future correspondence. If you have any questions concerning this matter, please contact Ms. Cynthia Clark of the Solid and Hazardous Waste Permits Section at (225) 219-3089.

Sincerely,

Beth Scardina
Environmental Scientist Manager
Solid and Hazardous Waste Permits Section



OFFICE OF ENVIRONMENTAL SERVICES • P.O. BOX 4313 • BATON ROUGE, LOUISIANA 70821-4313

AN EQUAL OPPORTUNITY EMPLOYER



February 21, 2005

MOTIVA
ENTERPRISES LLC

HAND DELIVERED

MAIN FILE 5 FEB 22 P2:27

Ms. Beth Scardina
Solid and Hazardous Waste Permits Section
Louisiana Department of Environmental Quality
Office of Environmental Services
P.O. Box 4313
Baton Rouge, Louisiana 70821-4313

original to TOSW
copy to WAS/G2/Scardina
Aug 5 FEB 22 P2:27

Re: Permit Renewal Application P-0246
Biosludge Landfarm
AI# 2719
Facility ID Number GD-093-1513
PER 1999005

LDEQ FILED

Ms. Scardina:

As requested in your letter dated January 21, 2005, Motiva Enterprises LLC Convent Refinery (Motiva) hereby submits six (6) bound copies of the complete modified Biosludge Landfarm Solid Waste Permit application (P-0246). This updated application combines our April 29, 2004 Permit renewal with the Notice of Deficiency (NOD) responses dated September 9, 2004 and November 17, 2004.

The enclosed document incorporates changes made to the biosludge landfarm to improve the performance of the leachate collection system and biosludge application process. These changes have substantially improved both the operational and environmental performance of this system.

Should you have any questions regarding this matter, please contact Bill Paul of my staff at (225) 562-6328.

Sincerely,

Susan Staley

Susan I. Staley
Environmental Manager

WPP

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FEB 22 2005

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MOTIVA

ENTERPRISES LLC

Shell, Texaco & Saudi Aramco Working Together

MAIN FILE

Biosludge Landfarm

Convent Refinery

GD-093-1513/P-0246

AI#2719

Solid Waste Permit Modification

Submitted to:

Louisiana Department of Environmental Quality

Permits Division

SW & HW Permits	
Permit Writer	<i>Cynthia Clark</i>
ETD	<i>Engineering</i>
AI#	<i>2719</i>
PER#	<i>19990005</i>
TEMPO Task #	<i>1526166</i>
Route to	<i>Bijan Sharafkhani</i>
Due Date	<i>3/25/05</i>

February 2005



PROVIDENCE

ENGINEERING & ENVIRONMENTAL GROUP LLC

MOTIVA

ENTERPRISES LLC

Biosludge Landfarm
Convent Refinery
GD-093-1513/P-0246
AI#2719

Solid Waste Permit Renewal Application

**Submitted to:
Louisiana Department of Environmental Quality
Permits Division**

February 2005

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APR 29 2005

LDEQ



PROVIDENCE
ENGINEERING & ENVIRONMENTAL GROUP LLC



**MOTIVA ENTERPRISES LLC
BIOSLUDGE LANDFARM
CONVENT REFINERY
GD-093-1513/P-0246
AI# 2719**

**SOLID WASTE
PERMIT RENEWAL APPLICATION**

FEBRUARY 2005

PREPARED BY:

**PROVIDENCE ENGINEERING AND
ENVIRONMENTAL GROUP, INC.
6160 PERKINS ROAD, SUITE 400
BATON ROUGE, LOUISIANA 70808
(225) 766-7400**

RECEIVED

FEB 22 2005

LDEQ

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INTRODUCTION

Motiva Enterprises LLC, Convent Refinery was originally built in 1967 by Texaco. In 1989, the plant became a Saudi Aramco partner as part of Star Enterprise. The plant became a part of Motiva Enterprises LLC in 1998 adding Shell as a partner.

Major refining process units include Atmospheric and Vacuum Crude Distillation, Fluid Catalytic Cracking, Resid Hydrocracking, Catalytic Reforming, Alkylation, Hydrotreating, Hydrogen Generation and Sulfur Recovery. Major products produced at the plant include gasolines, diesel fuel, jet fuel, heating oils, LPG, and molten sulfur.

Wastewaters resulting from plant operations are treated in the wastewater treatment system on-site. Wastewater treatment begins in either API Separator No. 1 or API Separator No. 2, which remove oil and solids. From the API Separators, wastewater flows to the equalization tank that provides a relatively constant flow and minimizes changes in loading rate and constituent concentration of the effluent. From the equalization tank, wastewater flows to aeration basins No. 1 and No. 2, where biological treatment takes place. From the aeration basins, wastewater flows to the activated sludge clarifiers. In the clarifiers, biological sludge is allowed to settle for recirculation back to the aeration basins. Clear water overflows the clarifier weirs and flows to the recycle pond. Sludge waste from the activated sludge clarifiers is pumped to the aerobic digester. The digested sludge is then applied to the biosludge landfarm for biodegradation.

In accordance with the Solid Waste Rules and Regulations, the Biosludge Landfarm is classified as a Type I landfarm, which is designed to serve as the final disposal area for non-hazardous waste generated on-site by the Wastewater Treatment System. This document is being submitted as a permit renewal application for Motiva's Solid Waste Standard Permit No. P-0246 for the existing, on-site Biosludge Landfarm. This application includes the April 2002 Solid Waste Permit Modification to the leachate collection system for the facility.

1701 ADDENDUM

LOUISIANA ADMINISTRATIVE CODE
TITLE 33 - ENVIRONMENTAL QUALITY
PART VII - SOLID WASTE

§521. Part II: Supplementary Information, All Processing and Disposal Facilities

The following information is required in the permit application for solid waste processing and disposal facilities. All responses and exhibits must be identified in the following sequence to facilitate the evaluation. Additionally, all applicable sections of LAC 33:VII.Chapter 7 must be addressed and incorporated into the application responses. If a section does not apply, the applicant must state that it does not apply and explain why.

A. **Location Characteristics.** Standards pertaining to location characteristics are contained in LAC 33:VII.709.A (Type I and II facilities), LAC 33:VII.717.A (Type I-A and II-A facilities), and LAC 33.719.A (Type III facilities).

1. The following information on location characteristics is required for all facilities:

a. **Area Master Plans** - a location map showing the facility, road network, major drainage systems, drainage-flow patterns, location of closest population center(s), location of the public-use airport(s) used by turbojet aircraft or piston-type aircraft, proof of notification of affected airport and Federal Aviation Administration as provided in LAC 33:VII.709.A.2, location of the 100-year flood plain, and other pertinent information. The scale of the maps and drawings must be legible, and engineering drawings are required.

As shown on the Area Master Plan and the Aerial Photograph, included as Figures 1 and 2, respectively, Motiva Enterprise's LLC Louisiana Plant (Motiva) is located on the Ascension/St. James Parish boundary line, along the east bank of the Mississippi River, 0.5 miles north of the intersection of Highways 44 and 70. The 3,800-acre Motiva site is composed of two parcels of land. The original parcel consists of 1,400 acres entirely within St. James Parish and is the site of the existing refinery and biosludge landfarm. The second parcel consists of approximately 2,500 acres of undeveloped land lying entirely in Ascension Parish.

The site resides in the Mississippi Alluvial Valley, which is a deltaic plain; the river ceases to gather surface inflow and, under normal conditions, would become a distributing

stream. Natural levees were created by the deposition of sediment during periods of overbank flooding. The levees are highest near the river and generally slope away to merge with a backswamp area. Directly north of the refinery site is an upland region, which slopes southward and ends near the St. James Parish boundary line. The swamplands have maximum elevations of 3 - 5 feet National Geodetic Vertical Datum (NGVD) and are drained by a network of tributary streams and canals.

The Area Master Plan shows the facility, road network, major drainage systems, drainage-flow patterns and the closest population centers of Union and Lemannville.

The Biosludge Landfarm is not located within 10,000 feet of any public-use airport runway end used by turbojet aircraft or within 5,000 feet of any public-use airport runway end used by piston-type aircraft. As indicated by the flood map, Figure 3, the facility is also not located within the 100-year flood plain.

The Biosludge Landfarm does not receive waste from off-site. The roads providing access to the facility are all-weather roads that can meet the demands of the facility and have been designed to avoid, to the extent practicable, congestion, sharp turns, obstructions, or other hazards conducive to accidents; and the roads are adequate to withstand the weight of transportation vehicles.

- b. A letter from the appropriate agency or agencies regarding those facilities receiving waste generated off-site, stating that the facility will not have a significant adverse impact on the traffic flow of area roadways and that the construction, maintenance, or proposed upgrading of such roads is adequate to withstand the weight of the vehicles.**

The above citation is not applicable. Motiva's biosludge landfarm does not receive waste from off-site.

- c. Existing Land Use - a description of the total existing land use within three miles of the facility (by approximate percentage) including, but not limited to:**

As stated in the letter from the St. James Parish President's Office (Appendix C), Motiva's site is not zoned.

The following percentages were determined using base data from the United States Geological Survey Maps "Gonzales,

Louisiana" (1991), "Sorrento, Louisiana" (Photorevised 1980), "Donaldsonville, Louisiana" (Photorevised 1981), and "Convent, Louisiana" (Photorevised 1981). The data was then updated and adjusted using the 1991 St. James Parish Profile and the 1991 Ascension Parish Profile as prepared by the Louisiana Department of Economic Development using statistics from the 1990 United States Census.

i. residential;

Approximately 18% of the land within a 3-mile radius of the biosludge landfarm is used for residential purposes.

ii. health-care facilities and schools;

Approximately 1% of the land within a 3-mile radius of the biosludge landfarm is used for health care facilities and schools.

iii. agricultural;

Approximately 20% of the land within a 3-mile radius of the biosludge landfarm is used for agricultural purposes.

iv. industrial and manufacturing;

Approximately 30% of the land within a 3-mile radius of the biosludge landfarm is used for industrial and manufacturing purposes.

v. other commercial;

Approximately 10% of the land within a 3-mile radius of the biosludge landfarm is used for other commercial purposes.

vi. recreational; and

Approximately 1% of the land within a 3-mile radius of the biosludge landfarm is used for recreational purposes.

vii. undeveloped.

Approximately 20% of the land within a 3-mile radius of the biosludge landfarm is undeveloped.

- d. **Aerial Photograph**—a current aerial photograph, representative of the current land use, of a one-mile radius surrounding the facility. The aerial photograph shall be of sufficient scale to depict all pertinent features. (The administrative authority may waive the requirement for an aerial photograph for Type III facilities.)

A current aerial photograph, representative of the current land use of a 1-mile radius surrounding the facility is included as Figure 2. The aerial photograph is of sufficient scale to depict all pertinent features.

- e. **Environmental Characteristics**—the following information on environmental characteristics:

- i. a list of all known historic sites, recreation areas, archaeological sites, designated wildlife-management areas, swamps and marshes, wetlands, habitats for endangered species, and other sensitive ecological areas within 1,000 feet of the facility perimeter or as otherwise appropriate;

Based on the letter dated October 28, 2004 from the Louisiana Department of Culture, Recreation, and Tourism, there are two known archaeological sites located within the area surrounding the facility. However, the Louisiana Department of Culture, Recreation, and Tourism states that the facility will not have an adverse affect to either site as documented in the correspondence presented in Appendix F.

The Louisiana Department of Wildlife and Fisheries indicated in a letter dated September 28, 2004 that a database indicated that a bald eagle nest was observed in 2003 within the surrounding area. However, the Louisiana Department of Wildlife and Fisheries indicated that no impact is anticipated from the facility on this species as documented in the correspondence presented in Appendix G.

The site is not located in a designated wetland, as confirmed by the U.S. Army Corps of Engineers in the letter included as Appendix H.

- ii. documentation from the appropriate state and federal agencies substantiating the historic sites, recreation areas, archaeological sites, designated

wildlife-management areas, wetlands, habitats for endangered species, and other sensitive ecological areas within 1,000 feet of the facility; and

Based on the letter dated October 28, 2004 from the Louisiana Department of Culture, Recreation, and Tourism, there are two known archaeological sites located with the area surrounding the facility. However, the Louisiana Department of Culture, Recreation, and Tourism states that the facility will not have an adverse affect to either site as documented in the correspondence presented in Appendix F.

- iii. a description of the measures planned to protect the areas listed from the adverse impact of operation at the facility;**

Based on the letter dated October 28, 2004 from the Louisiana Department of Culture, Recreation, and Tourism, there are two known archaeological sites located with the area surrounding the facility. However, the Louisiana Department of Culture, Recreation, and Tourism states that the facility will not have an adverse affect to either site as documented in the correspondence presented in Appendix F.

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- f. A wetlands demonstration, if applicable, as provided in LAC 33:VII.709.A.4.**

The above citation is not applicable. Motiva's biosludge landfarm has received waste prior to October 9, 1993 and is not located in wetlands.

- g. Demographic Information—the estimated population density within a three-mile radius of the facility boundary, based on the latest census figures.**

Recent data indicates that the population density within a three-mile radius of the facility is 43 persons/square mile. The data was obtained with the use of *Landview*™ II, a CD-

ROM produced by the EPA and U.S. Department of Commerce and based on 1990 Census Data. The coordinates of the Biosludge Landfarm were input into the program and a radius of three miles was specified. Using these parameters, a population of 1203 persons was given for the 28 square mile area.

2. The following information regarding wells, faults and utilities is required for Type I and II facilities:

- a. Wells.** Map showing the locations of all known or recorded shot holes and seismic lines, private water wells, oil and/or gas wells, operating or abandoned, within the facility and within 2,000 feet of the facility perimeter and the locations of all public water systems, industrial water wells, and irrigation wells within one mile of the facility. A plan shall be provided to prevent adverse effects on the environment from the wells and shot holes located on the facility.

The Well Location Map (Figure 4), depicts the location of water wells, operating or abandoned, and all oil and/or gas wells, operating or abandoned, within a 2,000-foot radius of the biosludge landfarm and all known industrial and irrigation wells within a 1-mile radius of the site. Water well information including the well number, owner and use is provided in Table 1.

There are no shot holes or wells other than those monitoring the landfarm that are located on the facility.

Information regarding seismic lines within the vicinity of the facility is not accessible. Based on conversations with both the Louisiana Department of Natural Resources and the Louisiana Geologic Survey, information regarding the location of seismic lines is not available from these agencies and is generally retained as confidential information by private firms.

b. Faults

- i. scaled map showing the locations of all recorded faults within the facility and within one mile of the perimeter of the facility; and**

A review of the Fault and Salt Map of South Louisiana, 1982, W.E. Wallace, concerning the geology of Ascension and St. James Parishes indicates that no

faults (surface or subsurface) with displacement during Holocene time exist within the facility or within 1 mile of the perimeter of the facility.

- ii. **demonstration, if applicable, of alternative fault set-back distance as provided in LAC 33:VII.709.A.5.**

This citation does not apply. The biosludge landfarm received waste prior to October 9, 1993.

- c. **Utilities. Scale map showing the location of all pipelines, power lines, and right-of-ways within the site.**

The General Plant Land Map showing all pipelines, power lines, and right-of-ways within the site are shown on Figure 5.

- B. Facility Characteristics.** Standards concerning facility characteristics are contained in LAC 33:VII.709.B (Type I and II facilities), LAC 33:VII.717.B (Type I-A and II-A facilities), and LAC 33:VII.719.B (Type III facilities). A facility plan, including drawings and a narrative, describing the information required below must be provided.

1. The following information is required for all facilities:

- a. elements of the process or disposal system employed, including, as applicable, property lines, original contours (shown at not greater than five-foot intervals), buildings, units of the facility, drainage, ditches and roads;**

For a comprehensive description of the operation of the biosludge landfarm, please refer to the Biosludge Landfarm's Facility Operational Plan, included as Appendix I.

Buildings, facilities, roads, and other elements of the site are shown on the Area Master Plan included as Figure 1, and the Site Master Plan included as Figure 6. The Biosludge Landfarm Original Contour Map is included as Figure 7, and the Site Grade Plan is included as Figure 8. Other elements of the process are shown on the drawings for the Leachate Collection System included as Figure 9 and the Biosludge Landfarm Details and Sections included as Figure 10.

The highest natural elevation on the entire Motiva site is about 25 feet NGVD (114 feet plant datum) and occurs along the top of the levee near the river. Immediately eastward of the levee, the elevation is somewhat lower, on the order of 20-24 feet NGVD (109-113 feet plant datum). The site slopes gently away from the river for a distance of 2 - 3 miles to an elevation of about 3 feet NGVD (92 feet plant datum). The slope continues to the outer edges of the backswamp until an elevation of about 2 feet NGVD is reached while the interior of the backswamp is virtually level at an elevation varying between 0.7 - 2.0 feet NGVD (89.7 - 91.0 feet plant datum).

Existing natural surface features within the alluvial valley are the consequence of river activity. These significant landforms developed in the past during periods of overbank flow. Sediment-laden waters overflowing from the river deposited their greatest load closely adjacent to the banks. Sands and coarse silts deposited in low ridges paralleling each bank are known as "natural levees" and have steep riverside slopes and flat landside slopes. Natural levees provide the most marked natural topographic feature of the site.

The surface elevations of the specific 15-acre biosludge landfarm site range from 11-5 feet NGVD (100 - 94 feet plant datum).

The waste material applied to the biosludge landfarm is biosludge generated from the wastewater treatment facility. The wastewater treatment facility manages contaminated stormwater and process wastewater from refinery operations. Wastewater treatment at the refinery includes equalization, biological treatment, and separation.

Wastewater treatment typically begins in either API Separator No. 1 or API Separator No. 2, which remove oil and solids. From the API Separators, wastewater flows to the equalization tank that provides a relatively constant flow and minimizes changes in loading rate and constituent concentration of the effluent. From the equalization tank, wastewater flows to aeration basins No. 1 and No. 2, where biological treatment takes place. From the aeration basins, wastewater flows to the activated sludge clarifiers. In the clarifiers, biological sludge is allowed to settle for re-circulation back to the aeration basins. Clear water overflows the clarifier weirs and flows to the recycle pond. Sludge waste from the activated sludge clarifiers is pumped to the aerobic digester. The digested sludge is then piped from the aerobic digester and is evenly distributed through the use of spray application as detailed on Figure 11 for the Biosludge Landfarm Distribution Piping System. A diagram detailing complete wastewater flow throughout the facility is included as Figure 12.

b. the perimeter barrier and other control measures;

The refinery is completely surrounded by a chain link fence to deter unauthorized ingress or egress, and to prevent entry by domestic livestock. The refinery's fenced inside perimeter is sufficiently cleared and lighted to permit security patrol by vehicle or foot. Floodlighting has been installed at strategic areas within the plant and along the perimeter.

Vehicles entering or leaving the refinery must pass through the administration gate, storehouse gate, or other designated access points. The access gates are typically manned and/or monitored by contracted security guards.

c. a buffer zone;

Motiva maintains a buffer zone of at least 200 feet between the property line and the biosludge landfarm. No storage, processing, or disposal of solid waste will occur within the 200 foot buffer zone.

d. fire-protection measures;

Motiva has a well-equipped and trained fire and emergency organization that responds to all emergency situations. The firewater system is a system of looped headers, mains, and laterals supplying water to hydrants, monitors, and hydrants with pumper nozzles located in all unit process areas and off-plot areas including the tank farm and tanker wharf.

In addition to the typical fire protection equipment (a fire truck, fire extinguishers, etc.), Motiva is also equipped with a firewater system composed of piping that supplies firewater to the strategically located monitors and hydrants throughout the Motiva site. Additional assistance from local volunteer fire departments will be utilized, if needed.

e. landscaping and other beautification efforts;

The biosludge landfarm is located within the boundaries of the refinery, which generates the waste to be disposed. Therefore, landscaping and other beautification efforts are not required.

f. devices or methods to determine, record, and monitor incoming waste;

The biosludge is usually pumped directly from an aerobic digester to the landfarm, which prevents the introduction of any unauthorized solid waste.

The quantity of biosludge distributed on the 15-acre biosludge landfarm is determined by comparing level readings in the aerobic digester (the source of the biosludge) prior to and after application of the biosludge. Biosludge application procedures are described in the Operational Plan that is included as Appendix I.

Records of the biosludge volumes applied to the biosludge landfarm are included in the annual Solid Waste Generator's Report, as required by LAC 33:VII.715.C.1.a.i-iv. These records are maintained on-site.

g. NPDES discharge points (existing and proposed); and

Motiva currently discharges under an NPDES Permit which is included as Appendix J. The NPDES Permit was issued on August 14, 1992. An LPDES permit application for renewal has been submitted to LDEQ. Motiva currently has three permitted NPDES outfalls with the most significant outfall (in terms of flow) being NPDES Outfall 001. However, the current permit and outfall numbers are subject to change with the issuance of an LPDES permit.

The landfarm cell runoff and leachate are collected in leachate/runoff sumps located in each of the 5-acre landfarm cells. From the landfarm sump, the collected leachate/runoff is routed to the facility wastewater treatment system for treatment and subsequent discharge through a permitted discharge point or discharged directly to an approved discharge point.

The uncontaminated site runoff from the undeveloped and developed areas of Motiva is generally routed to NPDES Outfall 002, which discharges the uncontaminated site runoff into a ditch in route to the St. James Canal, as shown on the Site Master Plan included as Figure 6. The stormwater discharge system is currently under review to determine if additional monitoring of the stormwater is necessary. Based on this review, stormwater discharge monitoring points may be added or combined with the existing NPDES 002 Outfall. Motiva also has NPDES Outfall 003, which receives primary clarifier blowdown from the Water Treating Plant. NPDES Outfall 003 is located adjacent to the previously mentioned NPDES Outfall 001.

h. other features, as appropriate.

Motiva acknowledges that LDEQ may require a description of other features of facility characteristics, as appropriate.

2. The following information is required for Type I and II facilities:

a. areas for isolating nonputrescible waste or incinerator ash, and borrow areas; and

The above citation is not applicable. Motiva does not isolate nonputrescible waste, incinerator ash, or borrow areas within the biosludge landfarm area.

b. location of leachate collection/treatment/removal system.

A leachate collection system is not required for landfarms. However, a leachate collection system has been installed for the purpose of collecting and removing leachate from the biosludge landfarm. Maintenance of the landfarm leachate collection/treatment/removal systems necessary to ensure compliance with permit conditions and to maintain landfarm performance is done as required during the landfarm life. Selection of all materials utilized for this maintenance activity is accomplished utilizing established industry practices and may be different from the materials used at the time of construction. Finally, maintenance activities during the life of the biosludge landfarm may require changes including but not limited to changes in piping sizes, piping spacing, slopes of landfarm surfaces, collection sumps etc.

The biosludge landfarm leachate collection/treatment/removal system consists of a former system constructed as part of the original construction of the biosludge landfarm (now abandoned) and the new leachate collection/treatment/removal system installed as part of an upgrade to the existing system described below.

The biosludge landfarm consists of three 5 acre cells. In 2003, Motiva upgraded the leachate collection system within the landfarm including but not limited to the following steps:

- Decommissioned and abandoned in-place (or removed as appropriate) the previous leachate collection lines and associated equipment/lines that were located within the cells;
- Re-graded the top of the treatment zone to the approximate grades as shown on Figure 8 of this document to facilitate drainage;
- Installed new perforated leachate collection lines in granular material lined trenches within the treatment zone;
- The collection lines flow to a newly installed header pipe with surface drainage pipes that flow to the sump located at the southwest corner of each cell;
- The sumps are interconnected and flow to a main sump that transports the leachate to the refinery waste water treatment system;
- A granular filter zone was installed above the treatment zone; and
- The levee system was raised to properly contain the biosludge and provide containment for a 25 year, 24 hour storm event.

Each of the three 5-acre landfarm cells have surface drainage pipes that drain into the main header pipe and eventually drain to the collection sumps, which are located in the southwest corner of each cell. This minimizes standing water and helps to prevent erosion of the vegetated landfarm. Once the landfarm cell runoff is collected in the interconnected collection sumps it flows toward the landfarm collection sump as shown in the leachate collection system drawing included as Figure 9.

- C. **Facility Surface Hydrology.** Standards governing facility surface hydrology are contained in LAC 33:VII.711.A (Type I and II landfills), LAC 33:VII.713.A (Type I and II surface impoundments), LAC 33:VII.715.A (Type I and II landfarms), LAC 33:VII.717.C. (Type I-A and II-A facilities), and LAC 33:VII.719.C (Type III facilities).

1. The following information regarding surface hydrology is required for all facilities:

- a. a description of the method to be used to prevent surface drainage through the operating areas of the facility;

The landfarm site has a series of agricultural ditches flowing west to east which drain surface runoff into an unnamed ditch routed to the St. James Canal, as shown on the Site Master Plan, included as Figure 6. A perimeter dike surrounds the landfarm to prevent surface drainage from mixing with drainage from the biosludge landfarm area.

An exterior perimeter ditch exists on the north, east, and west sides of the 15-acre biosludge landfarm and is connected to the pre-existing external perimeter ditch which borders the southern edge of the landfarm, as shown on the Site Master Plan, included as Figure 6. The 15-acre biosludge landfarm is completely surrounded by an external perimeter ditch system with bottom grade elevations ranging from 6 - 4 feet NGVD to facilitate gravity flow towards the St. James Canal via a pair of unnamed ditches.

The drainage system within the landfarm treatment cells has been designed so that the biosludge landfarm catch basins and piping collect and route leachate and runoff from the landfarm cells to the landfarm sump. Motiva has established a water management process for landfarm runoff/leachate so that during a major storm, uniform pooling of standing water will occur over the landfarm. The objective of this process is to minimize standing water levels on the landfarm for periods of more than 8 hours so that adverse impacts to landfarm operations are minimized.

As shown on the Site Grade Plan (Figure 8), surface-runoff-diversion levees, canals, or devices have been installed to prevent drainage from the units of the facility which have not completed the post-closure period to adjoining areas during the 24-hour/25-year storm event.

The Motiva Biosludge Landfarm is protected by a levee system to prevent run-on during the peak discharge from a

25-year, 24-hour storm event. (See the Biosludge Landfarm Details and Sections, Figure 10).

The engineering protocols and testing frequencies used ensure that the grade and slope of both the on-site drainage system and the run-on diversion system serve their intended functions. In addition, regrading the slope of the landfarm on an as needed basis prevents erosion and facilitates the removal of runoff.

The Biosludge Landfarm is not located in the 100-year flood plain. The dikes surrounding the landfarm and separating the cells will be repaired on an as-needed basis to prevent run-on from adjacent areas and to maintain sufficient freeboard.

Additional information is presented in the response given for LAC 33:VII.521.H.1.a and the Biosludge Landfarm's Facility Operational Plan (Appendix I).

b. a description of the facility runoff/run-on collection system;

Each of the three 5-acre landfarm cells, which comprise Motiva's 15-acre biosludge landfarm, slope towards a catch basin that is located in the southwest corner of each cell. This slope minimizes standing water and helps to prevent erosion of the vegetated landfarm. Once the landfarm cell runoff is collected in the interconnected catch basins, it is piped to the Landfarm Collection Sump, as shown on the Leachate Collection System drawing and the Biosludge Landfarm Details and Sections drawing, included as Figures 9 and 10, respectively.

During storm conditions, the site runoff is collected and routed to the facility wastewater treatment system for treatment and subsequent discharge through a permitted discharge point or discharged directly to an approved discharge point.

The uncontaminated site runoff from the developed areas of Motiva's site is generally collected in unnamed ditches and routed to the stormwater pond before being discharged through Outfall 002. Outfall 002 is located at the end of an unnamed ditch which leads to the St. James Canal as shown on the Site Master Plan, included as Figure 6. As previously noted, the stormwater discharge system is currently under review to determine if additional monitoring of the stormwater is necessary. Based on this review, NPDES stormwater

discharge monitoring points may be added or combined with the existing NPDES Outfall 002. Outfall 003 receives clarifier blowdown from the Water Treating Plant and is located adjacent to Outfall 001. The uncontaminated site runoff from the undeveloped areas of Motiva's site flows directly through unnamed ditches into the St. James Canal.

c. the maximum rainfall from a 24-hour/25-year storm event;

Pursuant to LAC 33.715.A.1.c, a 24-hour/25-year rain event is defined as 12 inches of rainfall below 31 degrees north latitude.

d. the location of aquifer recharge areas in the site or within 1,000 feet of the site perimeter, along with a description of the measures planned to protect those areas from the adverse impact of operations at the facility; and

According to the 1988 map entitled, "Aquifer Recharge Potential of the Baton Rouge Quadrangle," the entire Motiva facility and areas within 1,000 feet of the perimeter are located in a nonrecharging area of the Alluvial Freshwater Aquifer System. Therefore, LAC 33:VII.715.A.1.b is not applicable.

The Mississippi River is located within 1,000 feet of the Motiva facility; however, biosludge landfarm operations do not adversely impact the Mississippi River, since Motiva operates under NPDES Permit No. LA0006041.

e. if the facility is located in a flood plain, a plan to ensure that the facility does not restrict the flow of the 100-year base flood or significantly reduce the temporary water-storage capacity of the flood plain, and documentation indicating that the design of the facility is such that the flooding does not affect the integrity of the facility or result in the washout of solid waste.

As shown on the Flood Zone Map (Figure 3), the Plant site lies within an area of minimal flooding that is unaffected by the 100-year flood plain. In addition, the Motiva facility has not flooded since it began operations in 1967.

- D. Facility Geology.** Standards governing facility geology are contained in LAC 33:VII.709.C (Type I and II facilities), LAC 33:VII.717.D (Type I-A and II-A facilities), and LAC 33:VII.719.D (Type III facilities).

- 1. The following information regarding geology is required for Type I and Type II facilities:**

- a. isometric profile and cross-sections of soils, by type, thickness, and permeability;**

The subsoils underlying the Motiva facility are generally uniform and consist primarily of tan and gray clays and silty clays underlain by greenish-gray or gray clays and silty clays with occasional strata of silty sands and sand. The surface soils consist primarily of medium stiff to stiff gray and tan clays and silty clays intermixed with occasional discontinuous layers of soft silty clay and clay and medium compact tan and gray clayey silt. The soils continue to an approximate 35 - 40 foot depth near the river to an approximate 23 - 27 foot depth toward the rear of the site. These surface materials may be natural-levee deposits or reworked Pleistocene materials. Beginning at depths of approximately 23 feet at the rear of the site to approximately 40 feet near the front of the site, stiff to very stiff tan and gray clay or silty clays were encountered, and the top of this stratum is identified as the surface of the Pleistocene formation. These Pleistocene clays continue to depths of approximately 65 - 80 feet below existing ground surface and are underlain by layers of medium stiff to very stiff gray, greenish-gray, or bluish-gray clays intermixed with occasional layers of sand and sandy clays. Natural, stable soils of low permeability exist over the entire biosludge landfarm site, as evidenced by the six geotechnical soil borings installed at the site. Isometric soil profiles and geologic cross-sections were developed from the soil borings and are presented in the sections labeled Figure 13 and Figure 14 respectively. Six borings were conducted at this site with approximately 450 feet spacing between each. The boring logs are included in Appendix L. Soil classification, Atterberg limits, strength, density, and vertical and horizontal permeability test results are also included in the field permeability test results included as Appendix M.

- b. logs of all known soil borings taken on the facility and a description of the methods used to seal abandoned soil borings;**

A map depicting the location of all borings, monitoring wells, and piezometers at the Biosludge Landfarm is included in

the Site Master Plan (Figure 6). Six soil borings were advanced to a depth of 40 ft. bgs in September 1988 and are identified as B-A through B-F. Four additional soil borings were advanced in November 1990 and were converted into monitoring wells identified as SW-17, SW-18, SW-19, and SW-20. The total depth of the monitoring wells range from 17 ft. bgs (SW-19) to 24.5 ft. bgs (SW-20). Monitoring Wells SW-17 through SW-20 are constructed of 4-inch diameter schedule 40 PVC pipe. Each monitoring well includes a five-foot screened interval constructed of 4-inch diameter schedule 40 PVC with a slot size of 0.010 inches. In accordance with 521.D.1.a, the boring logs for all soil borings and monitoring wells taken at the biosludge landfarm have been used to develop updated cross sections and isometric profiles.

Copies of the original, handwritten field logs and the typed logs for Soil Borings B-A through B-F are included in Appendix L. The six soil borings were drilled specifically for the landfarm project. Borings drilled for other geotechnical investigations that were not related to the construction of the biosludge landfarm, but in the vicinity of the biosludge landfarm, have also been included in Appendix L. All soil borings are shown on the Site Master Plan, included as Figure 6.

The geotechnical borehole spacing for the boring specific to the biosludge landfarm was 450 feet x 300 feet, as indicated on the Site Master Plan (Figure 6). All six borings were drilled to 40 feet below ground surface (bgs) and continuously sampled. An exemption was granted from the minimum of 3 borings at 100 feet below grade level (LAC 33:VII.709.C.1.c.ii) and is included as Appendix N. All soil boring logs installed to a depth of 100 feet that are located within 800 feet of the biosludge landfarm are located in Appendix L.

All soil borings at the site were abandoned by grouting to ground surface with a cement-bentonite grout mixture. The mixture ratio used to seal the boreholes was 7 gallons of water combined with one 94-pound bag of cement and 2% (2 pounds) of powdered bentonite. Appropriate time was allowed for the grout to harden and a cement cap was then placed over each borehole and covered with compacted soil.

- c. **results of tests for classifying soils (moisture contents, Atterberg limits, gradation, etc.), measuring soil strength, and determining the coefficients of permeability, and other applicable geotechnical tests;**

The results of all laboratory tests on samples from the six soil borings at the biosludge landfarm are presented on the logs of the borings (Appendix L). The legends of the boring logs, along with the laboratory testing program and test procedures, are also given. Additional permeability field test data is presented in Appendix M.

- d. **geologic cross-section from available published information depicting the stratigraphy to a depth of at least 200 feet below the ground surface;**

The Area Fence Diagram (Figure 15) is a cross-section depicting the stratigraphy to a depth of at least 200 feet bgs. This information was obtained from Louisiana Geological Survey Water Resources Bulletin No. 7.

- e. **for faults mapped as existing through the facility, verification of their presence by geophysical mapping or stratigraphic correlation of boring logs. If the plane of the fault is verified within the facility's boundaries, a discussion of measures that will be taken to mitigate adverse effects on the facility and the environment;**

This regulatory requirement is not applicable. According to published literature (Fault and Salt Map of South Louisiana, 1966), no faults, surface or subsurface, exist through the facility.

- f. **for a facility located in a seismic impact zone, a report with calculations demonstrating that the facility will be designed and operated so that it can withstand the stresses caused by the maximum ground motion, as provided in LAC 33:VII.709.C.2; and**

Please refer to the response given for LAC 33:VII.521.D.1.e.

- g. **for a facility located in an unstable area, a demonstration of facility design as provided in LAC 33:VII.709.C.3.**

The demonstration of facility design is not required. The biosludge landfarm is not located in an unstable area.

- 2. **The following information regarding geology is required by Type III woodwaste, and construction/demolition-debris facilities:**

The above citation is not applicable. The biosludge landfarm is a Type I facility.

E. Facility Subsurface Hydrology. Standards governing facility subsurface hydrology are contained in LAC 33:VII.715.A (Type I and II landfarms).

1. The following information on subsurface hydrology is required for all Type I facilities and Type II landfills and surface impoundments:

a. delineation of the following information for the water table and all permeable zones from the ground surface to a depth of at least 30 feet below the base of excavation:

i. areal extent beneath the facility;

From the soil boring logs, three general geological units are present within the upper 40 feet. A clay layer generally located from 0-15 ft. bgs; a silty clay/clayey silt layer generally located from 15-25 ft. bgs; and a clay layer generally located from 25-40 ft. bgs. Intermediate and discontinuous silty/silty clay/clayey silt lenses are present throughout the stratigraphy.

The top layer is a continuous clay, ranging from four feet thick in SW-19 to 18 feet thick in soil boring B-C. The layer is generally 10-15 feet thick throughout the facility. The clay is a stiff to medium stiff gray clay.

The middle layer is a silty clay/clayey silt unit. The unit ranges in thickness from four feet in soil borings B-C and B-F to at least 10 feet in monitoring well SW-17. The unit is generally six to eight feet thick throughout the facility, and is located between 15 to 25 ft. bgs.

Below the silty clay/clayey silt unit is another clay layer. The clay layer appears continuous and generally extends from 22-40 ft. bgs throughout the facility. Within this layer are discontinuous silty clay (soil boring B-D) and silt (soil boring B-B) lenses.

ii. thickness and depth of the permeable zones and fluctuations;

See the response for LAC 33:VII.521.E.1.a.i.

- iii. direction(s) and rate(s) of groundwater flow based on information obtained from piezometers and shown on potentiometric maps; and

Based on the potentiometric maps constructed as part of the Semi-Annual Groundwater Monitoring Report, the direction of groundwater flow in the upper permeable zone is south. A recent potentiometric map is included as Figure 16.

The uppermost water-bearing permeable zone is the silty clay/clayey silt layer which is located between 15 to 25 ft. BGS.

Four monitoring wells, SW-17 through SW-20 are screened in this uppermost water-bearing permeable zone. Past groundwater sampling events show that the groundwater direction is generally southeast. Using groundwater elevation data from October 1997, the maximum groundwater velocity gradient for the facility was 0.0022 ft/ft. Calculations for groundwater velocity gradients are included in Appendix O.

The lower confining unit is the clay layer located below 25 ft. BGS. Although silt and silty/clay lenses were observed in this confining layer, the lenses are not connected and are discontinuous throughout the facility.

The uppermost aquifer cannot be defined for this site, since a strata is not present that would yield a high volume of groundwater.

Using the geological cross-sections, the clay soils present at the bottom of all cross-sections provides a thick low permeability layer between the uppermost water-bearing permeable zone and any underlying aquifer below the confining clay layer. In the "Evaluation of the Uppermost Aquifer" report (prepared by NUS Corporation, July 1985), clays at the site were reported with vertical permeabilities ranging from 1.7×10^{-9} cm/sec to 1.9×10^{-8} cm/sec. These low vertical permeabilities indicate that no significant vertical movement of water exists through the clay layer.

- iv. any change in groundwater flow direction anticipated to result from any facility activities.**

Based on data accumulated during semi-annual groundwater sampling events, facility activities have not impacted groundwater flow direction.

- b. delineation of the following, from all available information, for all recognized aquifers which have their upper surfaces within 200 feet of the ground surface:**

- i. areal extent;**

Groundwater in the vicinity of the pant site is found in several aquifers separated by clay and silt layers as shown on the Aquifer Location Map, Figure 17. Located at about 150 - 350 feet bgs is a continuous shallow aquifer, in the older deltaic deposits of the Pleistocene age. Discontinuous alluvial deposits are found close to the Mississippi River, and younger deltaic deposits include natural-levee and point bar deposits, limited in extent but hydrologically important.

- ii. thickness and depth to the upper surface;**

Please refer to the response given for LAC 33:VII.521.E.1.b.i.

- iii. any interconnection of aquifers; and**

Based on published regional geological data in the Louisiana Geological Survey Water Resources Bulletin No. 7, "Ground Water in the Geismar-Gonzales Area, Ascension Parish, Louisiana" (Plate 1, dated October 1965), these aquifers are not hydraulically connected.

- iv. direction(s) and rate(s) of groundwater flow shown on potentiometric maps.**

Directional flow in the alluvial deposits is generally south-southeast (See Figure 16, recent Potentiometric Map). The Gonzales aquifer flows generally toward the Mississippi River (southwest) during most of the year, when the river is low. During the annual high river stage, flow is away from the Mississippi River in an easterly direction.

2. The following information on subsurface hydrology is required for Type II landfarms. Delineation of the following information for the water table and all permeable zones from the ground surface to a depth of at least 30 feet below the zone of incorporation:

The above citation is not applicable. The biosludge landfarm is a Type I landfarm.

- F. **Facility Plans and Specifications.** Standards governing facility plans and specifications are contained in LAC 33:VII.711.B (Type I and II landfills), LAC 33:VII.713.B (Type I and II surface impoundments), LAC 33:VII.715.B (Type I and II landfarms), LAC 33:717.E (Type I-A and II-A facilities), LAC 33:VII.721.A (Type III construction and demolition debris and woodwaste landfills), LAC 33:VII.723.A (Type III composting facilities), and LAC 33:VII.725.A (Type III separation facilities). Standards for groundwater monitoring are contained in LAC 33:VII.709.E (Type I and II facilities).

1. **Certification-**The person who prepared the permit application must provide the following certification:

"I certify under penalty of law that I have personally examined and I am familiar with the information submitted in this permit application and that the facility as described in this permit application meets the requirements of the Solid Waste Rules and Regulations. I am aware that there are significant penalties for knowingly submitting false information, including the possibility of fine and imprisonment."

Certification of compliance by Mr. Doug Quinn of Motiva is included as Appendix P.

The original design, plans, and specifications for the biosludge landfarm were originally reviewed and approved by Mr. Richard Major. The permit renewal application including changes to the original design, plans, and specifications for the biosludge landfarm were reviewed and approved by Mr. Todd Black of Providence Engineering. This certification is included in Appendix Q.

2. **The following information on plans and specifications is required for Type I and II facilities:**

- a. **detailed plan-view drawing(s) showing original contours, proposed elevations of the base of units prior to installation of the liner system, and boring locations;**

Figure 7 depicts original contours in the vicinity of the biosludge landfarm and Figure 6 shows the location of site borings.

- b. **detailed drawings of slopes, levees, and other pertinent features; and**

Detailed drawings of slopes, levees, and other pertinent features of the facility is shown on Figure 8, 9, 10, and 11.

- c. the type of material and its source for levee construction. Calculations shall be submitted demonstrating that an adequate volume of material is available for the required levee construction.**

The initial levee construction was completed as described in the Facility Operational Plan Biosludge Landfarm in Appendix I. Soils used for the initial construction of the dikes consisted of earth excavated from the site that complied with design requirements. Soils for the planned levee upgrade, may come from onsite or from a regional commercial soil pit.

Future maintenance and/or modifications of the dikes necessary to ensure compliance with permit conditions, and to maintain landfarm performance will be done as required during the landfarm life. Selection of all materials utilized for this maintenance activity will be accomplished utilizing established industry practices and may be different from the materials used at the time of construction. Materials used in any future levee maintenance activities may come from on-site or off-site sources.

The perimeter levee of the landfarm has been engineered to minimize wind and water erosion, has a grass cover to preserve structural integrity, and provides adequate freeboard above the 100-year flood elevation.

- 3. The following information on plans and specifications is required for Type I, II, and III landfills:**

The above citation is not applicable. The biosludge landfarm is a Type I landfarm.

- 4. The following information on plans and specifications for the prevention of groundwater contamination must be submitted for Type I and II facilities:**

- a. representative cross-sections and geologic cross-sections showing original and final grades, approximate dimensions of daily fill and cover, drainage, the water table, groundwater conditions, the location and type of liner, and other pertinent information;**

As indicated on Figure 6, Site Master Plan, there are three biosludge landfarm treatment cells located at the Louisiana Plant. The three treatment cells are designed to operate in conjunction during normal operations or separately to provide for individual maintenance.

The drainage pattern and flow scheme of the biosludge landfarm are shown on the Site Grade Plan, Figure 8. The plans and sections of the biosludge landfarm cells and associated piping are included in the Leachate Collection System and Details and Section drawings, Figures 9 and 10 respectively. These plans show original and final grades and special drainage features. A description of the groundwater conditions pertinent to the plant site as well as the individual facility is discussed in response to LAC 33:VII.521.E. Following modifications to the existing biosludge landfarm, the surface drainage will remain consistent with drainage pattern and flow scheme shown in Figure 8.

The facility handles only on-site generated waste that accumulates in the refining process. The landfarm cells function as treatment areas; therefore, the requirement for daily fill and cover does not apply.

The landfarm cells are lined with 4 feet of recompacted clay to prevent leachate from entering the underlying soil and filtering into the water table located approximately 12 feet bgs. With the approval of this application, the landfarm will be able to utilize the three feet of silty clay formerly used as the treatment zone to further protect groundwater.

- b. **a description of the liner system, which shall include: calculations of anticipated leachate volumes, rationale for particular designs of such systems, and drawings; and**

The biosludge landfarm treatment cells were constructed with a 4-foot compacted clay liner in each cell to protect the underlying soil and groundwater. An additional three feet of silty clay is the treatment zone on top of the four-foot clay liner. Leachate is routed through a perforated piping system installed in the treatment zone to a sump in the southwest corner of each landfarm cell. The system was designed to allow transfer of leachate to the Wastewater Treatment System southwest of the biosludge landfarm. The liner and piping construction details are shown in the Biosludge Landfarm Details and Sections (Figure 10).

- c. **a description of the leachate collection and removal system, which shall include calculations of anticipated leachate volumes, rationale for particular designs of such systems, and drawings.**

A leachate collection system is not required for landfarms. However, a leachate collection system has been installed for the purpose of collecting and removing leachate that percolates through the treatment zone of the biosludge

landfarm. Maintenance of the landfarm leachate collection/treatment/removal systems necessary to ensure compliance with permit conditions and to maintain landfarm performance will be done as required during the landfarm life. Selection of all materials utilized for this maintenance activity will be accomplished utilizing established industry practices. Finally, maintenance activities during the life of the biosludge landfarm may require changes, including but not limited to, changes in piping sizes, piping spacing, slopes of landfarm surfaces, collection sumps etc.

The biosludge landfarm leachate collection/treatment/removal system consists of a former system constructed as part of the original construction of the biosludge landfarm (now abandoned) and the new leachate collection/treatment/removal system which has been installed as part of an upgrade to the existing system described below:

In 2003, Motiva upgraded the leachate collection system within the landfarm including but not limited to the following steps:

- Decommissioned and abandoned in-place (or removed as appropriate) the previous leachate collection lines and associated equipment/lines that were located within the cells;
- Re-graded the top of the treatment zone to the approximate grades as shown on Figure 8 of this document to facilitate drainage;
- Installed new perforated leachate collection lines in granular material lined trenches within the treatment zone;
- The collection lines flow to a newly installed header pipe with surface drainage pipes that flows to the sump located at the southwest corner of each cell;
- The sumps are interconnected and flow to a main sump that transports the leachate to the refinery waste water treatment system;
- A granular filter zone was installed above the treatment zone; and
- The levee system was raised to properly contain the biosludge and provide containment for a 25 year, 24 hour storm event.

Each of the three 5-acre landfarm cells have surface drainage pipes that drain into the main header pipe and eventually drain to the collection sumps, which are located in

the southwest corner of each cell. This minimizes standing water and helps to prevent erosion of the vegetated landfarm. Once the landfarm cell runoff is collected in the interconnected collection sumps it flows toward the landfarm collection sump as shown in the leachate collection system drawing included as Figure 9.

The biosludge landfarm treatment cells were constructed with a 4-foot compacted clay liner in each cell to protect the underlying soil and groundwater. An additional three feet of silty clay, which is the treatment zone, has been utilized on top of the four-foot clay liner for further protection. Leachate is routed through a perforated piping system installed in the treatment zone to a sump in the southwest corner of each landfarm cell. The system was designed to allow transfer of leachate to the Wastewater Treatment System southwest of the biosludge landfarm. The liner and piping construction details are shown in Figure 10, Biosludge Landfarm Details and Sections, of the permit renewal application.

Pursuant to LAC 33.715.A.1.c, a 24-hour/25-year rain event is defined as 12 inches of rainfall below 31 degrees north latitude.

5. **The following information on plans and specifications for groundwater monitoring must be provided for Type I and II facilities:**
 - a. **a minimum of three piezometers or monitoring wells in the same zone must be provided in order to determine groundwater flow direction;**

To ensure the containment of solid waste within the biosludge landfarm, four groundwater monitoring wells were installed adjacent to the facility, (see Figure 18, Monitoring Well Location Map). As shown on the monitoring well cross sections in Appendix R, all four wells are screened in the uppermost water-bearing permeable zone located from a depth of approximately 12 to 24 ft bgs. The screened depths vary based on the point at which groundwater was first encountered during the soil boring. The total depth of the monitoring wells range from 17 ft. bgs (SW-19) to 24.5 ft. bgs (SW-20). Monitoring Wells SW-17 through SW-20 are constructed of 4-inch diameter schedule 40 PVC pipe. Each monitoring well includes a five-foot screened interval constructed of 4-inch diameter schedule 40 PVC with a slot size of 0.010 inches.

The placement and construction of these monitoring wells were selected to detect contamination from the facility. Therefore, the monitoring wells were placed as close to the landfarm as possible and screened in the stratum most likely to be affected by contaminant migration. Monitor well cross sections are included as Appendix R.

Motiva will operate and maintain these monitoring wells, piezometers, and other measurement, sampling, and analytical devices so that they perform to design specifications throughout the life of the monitoring program.

- b. for groundwater monitoring wells, cross-sections illustrating construction of wells, a scaled map indicating well locations and the relevant point of compliance, and pertinent data on each well, presented in tabular form, including drilled depth, the depth to which the well is cased, screen interval, slot size, elevations of the top and bottom of the screen, casing size, type of grout, ground surface elevation, etc.;**

Cross-sections illustrating monitoring well construction details and pertinent data on each monitoring well, presented in tabular form, including drilled depth, the depth to which the monitoring well is cased, screen interval, slot size, elevations of the top and bottom of the screen, casing size, type of grout, ground surface elevation, etc., are included as monitoring well cross-sections, Appendix S, and Table 1 of the Groundwater Sampling and Analysis Plan (Appendix S).

The relevant point of compliance for the Motiva biosludge landfarm is the vertical surface of the facility's exterior boundaries and extends down into the uppermost aquifer underlying the facilities. Three of the four groundwater monitor wells in the Motiva groundwater monitoring system are downgradient; these are Monitor Wells SW-17, SW-18, and SW-19, and each yields groundwater samples from the uppermost aquifer underlying the facility that represents the quality of groundwater passing the relevant point of compliance. The point of compliance is shown on the Plan View drawing for the biosludge landfarm in Figure 19.

The relevant point of compliance was selected based on the required factors as detailed in LAC 33:VII.709.E.1.a. These eight factors are provided in the paragraphs that follow:

1. Hydrological characteristics of the facility and the surrounding land;

Based on the results of six soil borings conducted prior to installing Monitor Wells SW-17 through SW-20, the generalized shallow subsurface geology consists primarily of tan and gray clays and silty clays, underlain by greenish-gray or gray clays and silty clays with occasional strata of silty sands and sand. The surface soils consist primarily of medium stiff to stiff gray and tan clays and silty clays intermixed with occasional discontinuous layers of soft silty clay and clay and medium compact tan and gray clayey silt. The soils continue to approximately the 35 - 40 foot depth near the river to approximately the 23 - 27 foot depth toward the rear of the site. These surface materials may be natural-levee deposits or re-worked Pleistocene materials. Beginning at depths of approximately 23 feet at the rear of the site to approximately 40 feet near the front of the site, stiff to very stiff tan and gray clay or silty clays were encountered, and the top of this stratum is identified as the surface of the Pleistocene formation. These Pleistocene clays continue to depths of approximately 65 - 80 feet bgs, and are underlain by layers of medium stiff to very stiff gray, greenish-gray or bluish-gray clays intermixed with occasional layers of sand and sandy clays. An Isometric Geologic Profile Map is included as Figure 13. Soil boring logs are included as Appendix L.

2. Volume and physical and chemical characteristics of the soil and leachate;

The Biosludge Landfarm is lined with a 4-foot compacted layer of clay and has an additional three feet of silty clay to prevent contamination of the groundwater with the approval of this application.

3. The quality and direction of flow of groundwater in the uppermost aquifer;

Based on semi-annual groundwater sampling that Motiva has conducted and reported to LDEQ since May 1992, the local groundwater in the uppermost aquifer underlying the facilities is not contaminated. The direction of local groundwater flow in the uppermost aquifer underlying the facilities is southerly, as shown on the recent Potentiometric Contour Map (Figure 16). Further information is provided in LAC 33:VII.521.E.1.

4. The proximity and withdrawal rate of the groundwater users.

The location of groundwater wells in the proximity of the plant is given in Figure 4.

5. Availability of alternative drinking water supplies;

It is not expected that the upper most aquifer would be used for a source of drinking water due to the poor quality of the water and the low recharge.

6. Existing quality of the groundwater, including other sources of contamination and their cumulative impacts on the groundwater, and whether the groundwater is currently used or reasonably expected to be used for drinking water;

Based on semiannual groundwater sampling that Motiva has conducted and submitted to LDEQ since May 1992, the groundwater in the uppermost aquifer underlying the facilities is not contaminated. No other sources of potential groundwater contamination are in the vicinity of the facilities. The groundwater in the uppermost aquifer underlying the facilities is not currently used or reasonably expected to be used for drinking water.

7. Public health, safety, and welfare effects; and

Motiva anticipates no adverse impact on the public health, safety, or welfare due to operation of the biosludge landfarm. However, the groundwater monitoring system is designed to detect potential groundwater contamination at the earliest possible occurrence.

8. Practicable capability of the owner or operator;

There are no known factors prohibiting Motiva's practicable capability of selecting the relevant point of compliance.

The groundwater monitoring system for the biosludge landfarm is comprised of four groundwater monitor wells, SW-17 through SW-20. The wells were installed in November 1990, which was prior to promulgation of "Water Well Rules, Regulations, and Standards, State of Louisiana" (LAC

70:XIII). However, monitor well construction diagrams of Monitor Wells SW-17 through SW-20 are included as Appendix R. Each of the four wells is vented to the atmosphere and sealed with concrete to prevent surface contamination. The wells are screened and located to insure that only one water-bearing unit is sampled per well. Each well is protected by a steel casing and locked to prevent tampering.

All four of the monitor wells for the biosludge landfarm have protective casings with locking covers and a secure locking device in place, guard posts, and a screen length less than 10 feet. In addition, these four monitor wells allow at least 3 inches between the well casing and the borehole wall.

Each monitor well at the biosludge landfarm has a plate permanently affixed to each well's protective casing to prominently display each well's identification number, identification as upgradient or downgradient, elevation of top of well casing in relation to mean sea level or equivalent, screen depth in relation to mean sea level or equivalent, and date of well installation. Information regarding well repairs is maintained by the site groundwater contact person.

Motiva will obtain approval from LDEQ prior to the construction of any future monitor wells associated with the biosludge landfarm. Within 90 days after construction of any monitor well associated with the biosludge landfarm, Motiva will submit well-completion details to verify that the wells were constructed according to the approved specifications and to document construction procedures. The well-completion details will include daily field notes documenting construction procedures and any unusual occurrences such as grout loss, etc.; the boring log for each well includes surface elevation(s) with respect to mean sea level; and as-built diagrams for each well showing all pertinent features such as elevation of reference point for measuring groundwater levels, screen interval, and ground surface. If features change from the LDEQ approved plans, then a permit modification request will be submitted in accordance with LAC 33:VII.517.

- c. **a groundwater monitoring program including a sampling and analysis plan that includes consistent sampling and analysis procedures that ensure that monitoring results provide reliable indications of groundwater quality;**

Motiva's Groundwater Sampling and Analysis Plan (Appendix S) includes consistent sampling and analysis procedures that ensure that monitoring results provide reliable indications of groundwater quality at the background and downgradient well locations.

This Groundwater Sampling and Analysis Plan includes analysis of the following constituents that were not included in the original Groundwater Sampling and Analysis Program: selenium, vanadium, arsenic, biochemical oxygen demand (BOD₅) and nitrate. The remaining constituents provided for Type II landfills in Subsection E.3.g.iv, polychlorinated biphenyls (PCBs), is not applicable, since PCBs are not used in any equipment utilized at or near the site.

Motiva acknowledges that LDEQ may waive or require additional parameters or constituents based on site-specific or waste-specific information.

- d. **for an existing facility, all data on samples taken from monitoring wells in place at the time of the permit application must be included. (If this data exists in the Solid Waste Division records, the administrative authority may allow references to the data in the permit application.) For an existing facility with no wells, groundwater data shall be submitted within 90 days after the installation of monitoring wells. For a new facility, groundwater data (one sampling event) shall be submitted before waste is accepted;**

Motiva has an existing monitoring program in place. In the event that additional groundwater monitoring parameters are added to those already listed in the approved permit from the initial sampling event of 1991, or if new monitoring wells are installed, or if otherwise necessary, Motiva will complete an initial sampling event. The initial sampling event will be a minimum of four (4) independent samples collected for each new parameter. These samples will be collected quarterly over a period of one (1) year in order to reflect seasonal variations in groundwater quality. The fact is noted that some statistical methods require more than four (4) independent samples for the method to be valid.

- e. **a plan for detecting, reporting, and verifying changes in groundwater; and**

The Groundwater Sampling and Analysis Plan, which includes procedures for detecting, reporting, and verifying changes in groundwater, is included as Appendix S.

The Groundwater Sampling and Analysis Plan specifies that Motiva performs a trend analysis comparing the data from each sampling event to the average baseline data accumulated in 1991 to determine whether there has been an increase or decrease in trends over a period of time. This evaluation is conducted separately for each parameter or constituent in each well.

Motiva acknowledges that alternative statistical evaluations of groundwater data will have to be authorized by the LDEQ as allowed under LAC 33:VII.307.

If deemed necessary by the LDEQ, Motiva will submit revised statistical method(s) to the LDEQ as a permit modification within ninety (90) days after completion of the initial sampling event, or within 90 days of the date of approval of the final permit being issued if the 1991 sampling event is considered the initial sampling event. This permit modification will include the data collected from the initial sampling event, the proposed statistical method chosen for each parameter and justification for choosing the proposed statistical method(s). This justification will provide verification of the underlying statistical assumptions and demonstrate that the statistical method chosen for each individual parameter is the most appropriate method based on the analytical data-set that was generated from the initial sampling event.

Motiva acknowledges that final approval for the statistical method(s) chosen will be granted once it is demonstrated to the Department that the statistical methods chosen are technically sound and are the most appropriate methods.

Motiva will conduct an assessment monitoring program at the biosludge landfarm when significant increases are determined, according to LAC 33:VII.709.E.3.f.i-iv, for one or more of the parameters or constituents sampled and analyzed during the detection monitoring program. The assessment monitoring parameters or constituents will consist of the detection monitoring parameters or constituents.

Within 90 days after triggering an assessment monitoring program, Motiva will sample and analyze the groundwater at all wells for all the assessment monitoring parameters or constituents.

If after triggering an assessment monitoring program and assessment monitoring parameters or constituents are detected at concentrations significantly different from

background in the resampling event Motiva will, within 14 days of the determination, submit a report to LDEQ identifying the assessment monitoring parameters or constituents which are statistically different from background concentrations. Motiva will also notify all persons who own land or reside on the land that directly overlies any part of the plume of contamination if contaminants have migrated off site as indicated by the sampling of the wells according to LAC 33:VII.709.E.8.c.i.

Motiva will, upon consultation with and approval of LDEQ implement any interim measures necessary to ensure the protection of human health and the environment. The interim measures will, to the greatest extent practicable, be consistent with the objectives of and contribute to the performance of any remedy that may be required pursuant to LAC 33:VII.709.E.6, which outlines the selection of remedy and corrective action plan at Type II landfills and associated surface impoundments, although the Motiva biosludge landfarm is a Type I facility.

Motiva will consider the following factors in determining whether interim measures are necessary: time required to develop and implement a final remedy; actual or potential exposure of nearby populations or environmental receptors to hazardous parameters or constituents; actual or potential contamination of drinking water supplies or sensitive ecosystems; further degradation of the groundwater that may occur if remedial action is not initiated expeditiously; weather conditions that may cause hazardous parameters or constituents to migrate or be released; risks of fire or explosion, or potential for exposure to hazardous parameters or constituents as a result of an accident or failure of a container or handling system; and other situations that may pose threats to human health and the environment.

If a corrective-action plan is deemed necessary, Motiva will perform corrective action at the biosludge landfarm treatment units in accordance with LAC 33:VII.709.E.9.

Motiva will, within 270 days after the submittal of the assessment plan, submit to LDEQ four bound copies (8½ by 11 inches) of a corrective-action plan to remediate the groundwater. The corrective-action plan will describe the selected remedy and will also include a corrective-action groundwater monitoring program which meets the requirements of an assessment monitoring program outlined in LAC 33:VII.709.E.8, which indicates the effectiveness of the corrective-action remedy. In addition, the corrective-

action plan will include a schedule for initiating and completing remedial activities.

After a corrective-action plan submitted by Motiva has been approved by LDEQ based on the schedule for initiating and completing remedial activities, the facility will implement a corrective-action program to remediate the groundwater.

Motiva will, upon completion of the remedy associated with a corrective-action plan, submit within 14 days to LDEQ a certification that the remedy has been completed in compliance with the requirements of LAC 33:VII.709.E.7.h. The certification will be signed by the responsible party representing the facility and submitted to LDEQ for approval.

Motiva acknowledges that potential assessment monitoring, assessment of corrective measures, selection of remedies and corrective-action plans, and implementation of corrective-action plans for the biosludge landfarm, which is a Type I landfarm, is governed by Subsections E.1-3, E.8 and E.9 of this Section.

f. the method for plugging and abandonment of groundwater monitoring systems.

As explained in the Plugging and Abandonment Plan, Section 9.0 of the biosludge landfarm's Groundwater Sampling and Analysis Plan (Appendix S), Motiva will comply with "Water Well Rules and Regulations, State of Louisiana" (LAC 70:XIII), as adopted by the Louisiana Department of Transportation and Development, Water Resources Section, for all plugging and abandonment of wells and holes including observation wells, monitor wells, piezometer wells, leak-detection wells, assessment wells, recovery wells, abandoned pilot holes, test holes, and geotechnical boreholes.

6. The facility plans and specifications for Type I and II landfills and surface impoundments (surface impoundments with on-site closure and a potential to produce gases) must provide a gas collection and treatment or removal system.

The above citation is not applicable. The biosludge wastestream applied to the surface of the landfarm does not have the potential to produce methane gas or any other type of gas that might migrate and adversely affect human health or the environment.

- G. Facility Administrative Procedures.** Standards governing facility administrative procedures are contained in LAC 33:VII.711.C (Type I and II landfills), LAC 33:VII.713.C (Type I and II surface impoundments), LAC 33:VII.715.C (Type I and II landfarms), LAC 33:VII.717.F (Type I-A and II-A facilities), LAC 33:VII.721.B (Type III construction and demolition debris and woodwaste landfills), LAC 33:VII.723.B (Type III composting facilities), and LAC 33:VII.725.B (Type III separation facilities).

- 1. The following information on administrative procedures is required for all facilities:**

- a. recordkeeping system; types of records to be kept; and the use of records by management to control operations;**

Motiva maintains routine management and administrative records for the biosludge landfarm operation, as well as documentation required by the appropriate regulatory agencies.

Records maintained pertaining to solid waste include:

- Louisiana Solid Waste Rules and Regulations
- Solid Waste Permit No. P-0246
- Solid Waste Standard Permit Applications
- All Solid Waste Permit Modifications
- Daily Logs
- Quality Assurance/Quality Control (QA/QC) Records
- Inspection Schedules
- Record of LDEQ Inspections
- Records of inspections by the permit holder
- Monitoring, Testing or Analytical Data
- Contingency Plan and Emergency Procedures
- Groundwater Monitoring Reports, including Sampling Results
- Annual Solid Waste Generator Report
- Copies of documents from or submitted to the Louisiana Department of Environmental Quality (LDEQ)
- Semiannual Soil Waste Mixtures Tests and Analyses

Motiva will submit annual reports to the administrative authority indicating quantities and types of solid waste (expressed in wet-weight and dry-weight tons per year) disposed on the biosludge landfarm during the reporting period. The annual report will also indicate the estimated remaining permitted capacity at the facility as of the end of the reporting period (expressed in wet-weight tons). All

calculations used to determine the amounts of solid waste received for disposal during the annual-reporting period will be submitted to the administrative authority. A form to be used for this purpose will be obtained from the Permits Division.

The reporting period for the disposer annual report will be from July 1 through June 30, and terminating upon closure of the facility in accordance with the permit.

The disposer annual reports will be submitted to the administrative authority by August 1 of each reporting year. Copies of these reports will be maintained on site.

The disposer annual report will be provided for the biosludge landfarm on an annual-reporting form separate from other solid waste facilities.

The annual report will use the seven-digit industrial waste number that has been assigned by the administrative authority to the industrial solid waste generator.

A copy of the semiannual soil/waste mixtures tests and analyses of the results with conclusions will be submitted to the LDEQ as detailed in the operational plan, Appendix I. The parameters to be analyzed are also discussed in detail in the operational plan. This information will be maintained on site.

The biosludge landfarm is located entirely within Motiva's refinery property and is used for industrial purposes only. Test results on the soils, land use, and crop information are not applicable. An annual report will be submitted to the administrative authority containing calculated amounts of waste applied to the biosludge landfarm. This information will also be maintained on site.

Annual reports will be submitted to the administrative authority for a minimum of 10 years after closure and will contain analyses of all test results of the soils. The post-closure monitoring annual reporting may be reduced if the permit-holder demonstrates to the administrative authority's satisfaction that such reductions are warranted. When applicable, these reports will also be maintained on site.

The biosludge landfarm accepts only on-site generated, non-hazardous waste. The requirements of LAC 33:VII.715.C.1.b.ii for maintaining records of transportation do not apply.

Motiva will maintain at the facility all records specified in the application as necessary for the effective management of the facility and for preparing the required reports. All solid waste records will be available upon request for LDEQ inspection. These records will be maintained for the life of the facility and kept on file for at least 3 years after closure, as required by LAC 33:VII.715.C.1.b.i.

- b. an estimate of the minimum personnel, listed by general job classification, required to operate the facility; and**

The biosludge landfarm is operated by a staff of personnel necessary to perform all facility operations. These include but are not limited to the following positions:

Environmental Support
Operations Supervision
Maintenance Support
Operations

- c. maximum days of operation per week and per facility operating day (maximum hours of operation within a 24-hour period).**

The Motiva Refinery, including the biosludge landfarm, operates 24 hours per day, 7 days per week. Although the biosludge is applied to the landfarm on a rotating schedule, the biodegradation of the waste biosludge is a continuous process.

- 2. Administrative procedures for Type II facilities shall include the number of facility operators certified by the Louisiana Solid Waste Operator Certification and Training Program (R.S. 37:3151 et seq.).**

The above citation is not applicable. The biosludge landfarm is a Type I facility.

- H. **Facility Operational Plans.** Standards governing facility operational plans are contained in LAC 33:VII.711.D (Type I and II landfills), LAC 33:VII.713.D (Type I and II surface impoundments), LAC 33:VII.715.D (Type I and II landfarms), LAC 33:VII.717.G (Type I-A and II-A facilities), LAC 33:VII.721.C (Type III construction and demolition debris and woodwaste landfills), LAC 33:VII.723.C (Type III composting facilities), and LAC 33:VII.725.C (Type III separation facilities).

1. The following information on operational plans is required for all facilities:

- a. types of waste (including chemical, physical, and biological characteristics of industrial wastes generated on-site), maximum quantities of wastes per year, and sources of waste to be processed or disposed of at the facility;

The type of waste to be disposed at the biosludge landfarm is non-hazardous, biodegradable sludge generated after aggressive biological treatment (biosludge) in the Waste Water Treatment Unit. The waste contains biomass and nutrients such as nitrogen that make the waste inherently biodegradable in nature and also a natural fertilizer.

Recent chemical analyses of the biosludge are included in Appendix K. Biosludge is typically brown in color, consists of mostly water (normally 95-99%), and may have little odor to an odor of organic material. The biosludge solids (1-5%) consist primarily of biomass and may also include some heavy metals. If the biosludge is applied after being filter pressed, the filter cake will contain polymer or other non-hazardous components used in the filter pressing process and would contain less water.

The quantity of biosludge to be disposed at the biosludge landfarm is anticipated to be about 1446 dry tons/year (quantity may vary due to operating conditions).

Motiva does not plan to dispose of waste or debris generated by UST corrective action into the biosludge landfarm. The only waste which will be disposed of at the landfarm is biosludge which is biodegradable.

Motiva will keep documented process knowledge that confirms that the waste disposed at the landfarm is not a characteristic or listed hazardous waste as defined in LAC 33:V.Subpart 1. Included in Appendix K is a TCLP analysis of the biosludge that was conducted in 1989. In addition, the biosludge landfarm does not receive non-hazardous

petroleum-contaminated media and debris generated from underground storage tanks nor does it receive incinerator ash. For further information please refer to the Biosludge Landfarm's Facility Operational Plan, included as Appendix I.

b. waste-handling procedures from entry to final disposition, which could include shipment of recovered materials to a user;

The Clarifier biosludge is pumped to the aerobic digester units for additional aeration prior to being pumped to Landfarm Cells A, B, and/or C, as shown on the Wastewater Flow Diagram drawing included as Figure 12. The distribution of the biosludge is alternated between the three landfarm cells. The rotation provides time for the drying and biodegradation of the biosludge between applications. The biosludge influent into each of the three separate landfarm cells is controlled by valves, as shown on the Biosludge Landfarm Distribution Piping drawing included as Figure 11.

Each of the biosludge landfarm cells consists of distribution lines equipped with spray system for the application of biosludge to the biosludge landfarm treatment zone.

The desired application rate of less than 2.0 inches per week per acre is maintained through a weekly biosludge application process. After the biosludge distribution process is completed, the distribution lines are flushed with water to prevent clogging.

Based on Motiva's past landfarming experience, there are no odors associated with the landfarming process. Odor emanating from the landfarm is not expected to be a problem due to sanitary waste comprising <3% of the total waste stream influent. The nearest residences to the landfarm are approximately 0.5 miles away. However, if any odor complaints are made, an investigation is conducted and any necessary corrective action is taken. Additional information pertaining to landfarm operations is in Motiva's Facility Operational Plan, included as Appendix I.

The receipt of hazardous waste will be strictly prohibited and prevented and open burning shall not be practiced unless authorization is first obtained from the administrative authority and any other applicable federal, state, and local authorities.

The facility will be in compliance with Facility Operations in accordance with LAC 33:VII.715.D.1.e.

c. minimum equipment to be furnished at the facility;

Currently, the spray application method of waste placement is utilized at the biosludge landfarm. The minimum equipment to be furnished for the continual operation includes nozzles, distribution lines, drainage piping and landfarm sump pumps. When needed, grass cutting mowers are used to control vegetation on the surface of the landfarm.

d. plan to segregate wastes, if applicable;

The biosludge landfarm will accept the biosludge generated in the Motiva waste treatment facility. Therefore, there are no plans to segregate wastes since all of the biosludge to be disposed will originate from one source.

e. procedures planned in case of breakdowns, inclement weather, and other abnormal conditions (including detailed plans for wet-weather access and operations);

Equipment involved in operations at the biosludge landfarm is inspected on a regular basis and maintained to prevent breakdowns and ensure the containment of waste as described in the Weekly Inspection Schedule and Motiva's Facility Operational Plan, included as Appendix T and Appendix I, respectively. In the event of equipment failure, it is repaired as soon as practicable.

When water collects on the landfarm during rainstorms, the landfarm's runoff system is designed so that each cell can be independently drained and then isolated from the drainage system. This feature expedites the drainage of the remaining cells and can be seen on the Leachate Collection System and the Biosludge Landfarm Details included as Figure 9 and 10 respectively.

Severe weather conditions, such as hurricanes and other violent storms, may result in the temporary closure of the biosludge landfarm. Decisions to close the biosludge landfarm during inclement weather will be made by operations or the appropriate personnel.

f. procedures, equipment, and contingency plans for protecting employees and the general public from accidents, fires, explosions, etc., and provisions for emergency care should an accident occur (including proximity to a hospital, fire and emergency services, and training programs); and

Employees who are responsible for the operations of the biosludge landfarm are trained on facility safety rules and programs and on the operation of the biosludge landfarm. In addition to the safety program, several plans and procedures have been prepared and are in place that outline the procedures to be followed in the event of fire, explosion or other emergency situation. These include but are not limited to the following procedures:

- Emergency Plans Manual
- SPCC Plan/OPA 90
- Plant Hazardous Waste Contingency Plan and Emergency Procedures (Contingency Plan)

The nature and location of the biosludge landfarm preclude the necessity for specialized plans, as the existing plans are adequate to control any emergency as may be expected to occur at the facility. These plans and procedures are too extensive to include in this application, but are available for review at the Plant.

Provisions include but are not limited to notifying local authorities in the event an incident occurs that might impact the surrounding community. The equipment and personnel available at the Louisiana Plant are adequate to respond to any emergency condition that might arise. For extremely large or unusual incidents, the refinery has identified local fire and police departments, hospitals, and emergency response teams, which operate in the area of the facility or are subject to be called by the emergency coordinator or his designated representative.

All operational personnel at the biosludge landfarm will be required to wear protective equipment such as hard hats, safety glasses, gloves, and other equipment as necessary for protection against accidental injury. Should an accident causing injury occur, immediate medical care will be provided by the on-site medical facility, or, depending on the nature of the injury, at one of the two area hospitals.

The Contingency Plan will be filed with the local fire department and the closest hospital or clinic upon approval of the permit renewal. The plan will be updated annually or when implementation demonstrates that a revision is needed.

In addition, to meet the requirements of the Louisiana Revised Statutes, certification has been requested from the nearest hospital as to their ability to accept and treat patients who are contaminated with hazardous materials.

Certification has also been requested from the local emergency medical services as to their ability to meet the response requirements of 473 of the Life Safety Code. These requests for certification and responses are provided in Appendix U.

Motiva has the on-site ability to meet the response requirements of Section 472 of the Life Safety Code of the National Fire Protection Association. Therefore, certification from the local fire department is not necessary.

g. provisions for controlling vectors, dust, litter, and odors.

Reduction in vector attractiveness is achieved during the aeration of the biosludge in the aerobic digester.

2. The following information on operational plans is required for Type I and II facilities:

- a. a comprehensive operational plan describing the total operation, including (but not limited to) inspection of incoming waste to ensure that only permitted wastes are accepted (Type II landfills must provide a plan for random inspection of incoming waste loads to ensure that hazardous wastes or regulated PCB wastes are not disposed of in the facility.); traffic control; support facilities; equipment operation; personnel involvement; and day-to-day activities. A quality- assurance/quality-control [QA/QC] plan shall be provided for facilities receiving industrial waste; domestic-sewage sludge; incinerator ash; friable asbestos; nonhazardous petroleum- contaminated media; and debris generated from underground storage tanks [UST], corrective action, or other special wastes as determined by the administrative authority. The QA/QC plan shall include (but shall not be limited to) the necessary methodologies; analytical personnel; preacceptance and delivery restrictions; and appropriate responsibilities of the generator, transporter, processor, and disposer. The QA/QC plan shall ensure that only permitted, nonhazardous wastes are accepted;**

The Biosludge Landfarm's Facility Operational Plan, included as Appendix I, describes the use of the biosludge landfarm as related to the standards of LAC 33:VII.715.D. The comprehensive QA/QC program ensures that only nonhazardous wastes enter the landfarm for treatment.

The biosludge landfarm is located entirely within the refinery boundaries with traffic being controlled at the plant entrances. The biosludge landfarm does not require support facilities to operate.

b. salvaging procedures and control, if applicable; and

The above citation is not applicable. The waste disposed is not salvageable.

c. scavenging control.

The above citation is not applicable. The waste disposed is not scavengeable.

3. The following information on operational plans is required for Type I and II landfarms:

a. items to be submitted regardless of land use:

i. a detailed analysis of waste, including (but not limited to) pH, phosphorus, nitrogen, potassium, sodium, calcium, magnesium, sodium-adsorption ratio, and total metals (as listed in LAC 33:VII.715.D.3.b);

The sludge to be disposed of in the biosludge landfarm is categorized as industrial sludge, which is generated within the Motiva facility. A recent biosludge analysis for nitrogen, salts, and heavy metals is given in Appendix K.

Nitrogen concentrations in the waste will be within the limits that are determined to be acceptable. The possibility of nitrogen being leaked into the groundwater is not a concern since the landfarm is not designed as a closed system.

ii. soil classification, cation-exchange capacity, organic matter, content in soil, soil pH, nitrogen, phosphorus, metals (as listed in LAC 33:VII.715.D.3.b), salts, sodium, calcium, magnesium, sodium-adsorption ratio, and PCB concentrations of the treatment zone;

The soil that is underlying the biosludge landfarm is classified as clay to silty clay, as described in the response to LAC 33:VII.521.D.1.a. b.

Results from a recent biosludge analysis are included in Appendix K.

iii. annual application rate (dry tons per acre) and weekly hydraulic loading (inches per acre); and

The estimated application rate for the 15-acre biosludge landfarm is approximately 96.4 dry tons per acre per year. The hydraulic loading rate is approximately 1.02 inches per week but will not exceed the regulated 2.0 inches per week per acre. The application and hydraulic loading calculations are based on assumptions that can change as a result of changing operating conditions. This may increase or decrease the weekly hydraulic loading and dry weight loading to the biosludge landfarm but will not exceed permitted limits.

iv. an evaluation of the potential for nitrogen to enter the groundwater.

Based on the combined presence of an adequate downgradient groundwater detection monitoring system, documentation of approved biosludge landfarm construction procedures, and existing groundwater analytical data, the potential for nitrogen to enter the groundwater is evaluated as minimal, (see Table 2, Biosludge Landfarm Baseline Data).

b. items to be submitted in order for landfarms to be used for food-chain cropland:

The biosludge landfarm is not used for food-chain cropland.

c. items to be submitted for landfarms to be used for nonfoodchain purposes:

i. description of the pathogen-reduction method in septage, domestic sewage sludges, and other sludges subject to pathogen production; and

In order to demonstrate that sufficient pathogen reduction has occurred in the wastestream before it is applied to the landfarm, pathogen analyses were performed on samples of the waste taken before and after the wastestream enters the aerobic digester. The results of these analyses are in the Biosludge Analyses, included as Appendix K. To summarize the results, total coliform and fecal coliform concentrations were reduced from 61,000/100 ml and 52,000/100 ml to <1/100 ml and <1/100 ml, respectively. *Salmonella* sp. analyses indicated that *Salmonella* sp. is not present in the wastestream. The results indicate that pathogens are sufficiently reduced by the digester.

- ii. **description of control of public and livestock access.**

The refinery is completely surrounded by a fence to prevent unauthorized ingress or egress, except by willful entry, and to prevent entry by domestic livestock.

- 4. **The following information on operational plans is required for Type I-A and II-A incinerator waste-handling facilities and refuse-derived energy facilities:**

The above citation is not applicable. The biosludge landfarm is a Type I facility.

- 5. **The following information on operational plans is required for Type I-A and II-A refuse-derived fuel facilities and Type III separation and composting facilities:**

The above citation is not applicable. The biosludge landfarm is a Type I facility.

- 6. **The operational plans for Type I-A and II-A refuse-derived fuel facilities and Type III separation and composting facilities must include a description of marketing procedures and control.**

The above citation is not applicable. The biosludge landfarm is a Type I facility.

- 7. **The operational plans for Type I and II facilities receiving waste with a potential to produce gases must include a comprehensive air monitoring plan.**

The waste stream contained in the biosludge landfarm does not have the potential to produce methane gas or any other type of gas that might migrate and adversely affect human health or the environment.

- I. Implementation Plan. Standards governing implementation plans are contained in LAC 33:VII.709.D (Type I and II facilities), LAC 33:VII.717.H (Type I-A and II-A facilities), and LAC 33:VII.719.E (Type III facilities).**

- 1. The implementation plans for all facilities must include the following:**

- a. a construction schedule for existing facilities which shall include beginning and ending time-frames and time-frames for the installation of all major features such as monitoring wells and liners. (Time-frames must be specified in days, with day one being the date of standard permit issuance); and**

All construction activities have been completed.

- b. details on phased implementation if any proposed facility is to be constructed in phases.**

All construction activities have been completed.

- 2. The implementation plans for Type I and II facilities must include a plan for closing and upgrading existing operating areas if the application is for expansion of a facility or construction of a replacement facility.**

The above citation does not apply. This permit renewal is not for an expansion of the facility or construction of a replacement facility.

- J. Facility Closure.** Standards governing facility closure are contained in LAC 33:VII.711.E (Type I and II landfills), LAC 33:VII.713.E (Type I and II surface impoundments), LAC 33:VII.715.E (Type I and II landfarms), LAC 33:VII.717.I (Type I-A and II-A facilities), LAC 33:VII.721.D (construction and demolition debris and woodwaste landfills), LAC 33:VII.723.D (Type III composting facilities), and LAC 33:VII.725.D (Type III separation facilities)

1. The closure plan for all facilities must include the following:

a. the date of final closure;

The anticipated date of closure for the biosludge landfarm is February 2032. However, the life expectancy of the biosludge landfarm may extend longer than 30 years based on the analytical data for maximum allowable metal loading and capacity allowing a longer life for the facility. Motiva will submit formal written notification to LDEQ at least 90 days before the initiation of the final closure as required by LAC 33:VII.715.E.1.

b. the method to be used and steps necessary for closing the facility; and

Closure of the biosludge landfarm will occur such that the environment below and surrounding the site is protected, and the land is preserved for continued productive use. The basic principal of operation will be to restrict the application of biosludge to allow the site to return for productive use as a building site (i.e., Refinery expansion).

The method of closure of the biosludge landfarm will be in-place closure. Steps will include: removal of aboveground equipment, where necessary, such as piping; construction of a recompacted clay cap; placement of topsoil over the cap; and then establishment of a vegetative cover.

c. the estimated cost of closure of the facility, based on the cost of hiring a third party to close the facility at the point in the facility's operating life when the extent and manner of its operation would make closure the most expensive.

The estimated cost of closure and post-closure of the facility, based on the cost of hiring a third party to close the facility at the point in the facility's operating life when the extent and manner of its operation would make closure the most expensive is included as Appendix V. The estimated cost of closure is based on in-place closure, which is the anticipated method of closure.

2. **The closure plan for Type I and II landfills and surface impoundments must include:**

This section is not applicable. This permit renewal is being submitted for the biosludge landfarm.

3. **The closure plan for all Type I and II facilities and Type III woodwaste and construction/demolition debris facilities shall include the following:**

- a. **the sequence of final closure of each unit of the facility, as applicable;**

Motiva will notify the LDEQ in writing of the intent to close the biosludge landfarm 90 days prior to the initiation of closure procedures. This notification will include the date of planned closure; a drawing showing final contours of the area after closure; changes, if any, requested in the approved closure plan; and the closure schedule and cost estimate.

During the closure period for the biosludge landfarm, Motiva will:

Continue with all operations (including pH control) necessary to continue waste treatment within the treatment zone;
Maintain the run-on control system;
Maintain the runoff management system;
Maintain vegetative cover if necessary to control wind dispersal of odors and/or waste; and
Continue to comply with any prohibitions or conditions concerning growth of food-chain crops.

Motiva acknowledges that upon determination by the Administrative Authority that a facility has completed closure in accordance the approved plan, the Administrative Authority will release the permit holder from the closure and post-closure financial requirements.

- b. **a drawing showing final contours of the facility; and**

The Biosludge Landfarm is a landfarm. Therefore, no final cap is planned. Once the landfarm has completed its useful life, it will then be graded to drain stormwater away from the landfarm. The final contours will be dependent upon the quantity of waste contained in the facility once it has reached its useful life. The actual quantity could vary.

- c. **a copy of the document that will be filed upon closure of the facility with the official parish recordkeeper indicating**

the location and use of the property for solid waste disposal, unless the closure plan specifies a clean closure.

Included as Appendix W is a sample document that will be filed upon closure of the biosludge landfarm with the official St. James Parish recordkeeper. A true copy of the document certified by the parish clerk of court must be sent to the Permits Division of the Louisiana Department of Environmental Quality.

- K. **Facility Post-closure.** Standards governing post-closure requirements are contained in LAC 33:VII.711.F (Type I and II landfills), LAC 33:VII.713.F (Type I and II surface impoundments), LAC 33:VII.715.F (Type I and II landfarms), and LAC 33:VII.721.E (Type III construction and demolition debris and woodwaste landfills).

1. The post-closure plan for all facilities must include the following:

- a. **specification of the long-term use of the facility after closure, as anticipated; and**

Once closed, the biosludge landfarm site will not be used for a food-chain crop site, but will be available for future Refinery expansion.

- b. **the cost of conducting post-closure of the facility, based on the estimated cost of hiring a third party to conduct post closure activities in accordance with the closure plan.**

The cost of conducting post-closure of the facility, based on the estimated cost of hiring a third party to conduct post-closure activities in accordance with the closure plan is included as Appendix V.

2. The post-closure plan for Type I and II facilities must include the following:

- a. **the method for conducting post-closure activities, including a description of the monitoring and maintenance activities and the frequency at which they will be performed;**

The method for conducting post-closure activities is included in the Estimated Closure and Post-Closure Costs (Appendix V). Post-closure activities include groundwater monitoring and continual maintenance on an as-needed basis for a period of 10 years. Written reports of the groundwater sampling results shall be submitted to LDEQ annually, or on a frequency approved by LDEQ.

Motiva acknowledges that the length of the post-closure care period for the biosludge landfarm may be decreased or increased by the Administrative Authority if the permit holder demonstrates that the reduced period is sufficient to protect human health and the environment and this demonstration is approved by the Administrative Authority.

Motiva also acknowledges that the length of the post-closure care period for the biosludge landfarm may be increased by

the Administrative Authority if the Administrative Authority determines that the lengthened period is necessary to protect human health and the environment.

- b. the method for abandonment of monitoring systems, leachate collection systems, gas-collection systems, etc.;**

The Well Plugging and Abandonment Plan is included in the Groundwater Sampling and Analysis Plan, Appendix S.

- c. measures planned to ensure public safety, including access control and gas control; and**

Motiva will ensure that biodegradation of the sludge is complete and no gas is being produced prior to establishing the vegetative cover on the biosludge landfarm.

The grade and vegetative cover shall be maintained for a period of 10 years after closure of the site in accordance with LAC 33:VII.715.F.2.

Prior to and during closure operations, the runoff diversion system and run-off control system will be maintained and modified where necessary.

The groundwater monitoring wells will also be sampled and analyzed for a period of 10 years after the date of the closure inspection. Written reports of the groundwater sampling results shall be submitted to the Administrative Authority annually or on a frequency approved by the LDEQ. Gas control measures are not necessary.

- d. a description of the planned uses of the facility during the post-closure period.**

Once closed, the biosludge landfarm site will not be used for a food-chain crop site, but will be available for future Refinery expansion.

- L. Financial Responsibility.** Standards governing financial responsibility are contained in LAC 33:VII.727. A section documenting financial responsibility according to LAC 33:VII.727 which contains the following information, must be included for all facilities:

1. the name and address of the person who currently owns the land and the name and address of the person who will own the land if the standard permit is granted (if different from the permit holder, provide a copy of the lease or document which evidences the permit holder's authority to occupy the property); or

Motiva Enterprises LLC

2. the name of the agency or other public body that is requesting the standard permit; or, if the agency is a public corporation, its published annual report; or, if otherwise, the names of the principal owners, stockholders, general partners, or officers;

Please refer to the response given for LAC 33:VII.521.L.1.

3. evidence of liability coverage, including:
 - a. personal injury, employees, and the public (coverage, carriers, and any exclusions or limitations);
 - b. property damage (coverage and carrier);
 - c. environmental risks; and

Evidence of liability coverage is included as Appendix X.

4. evidence of a financial assurance mechanism for closure and/or post-closure care.

The financial assurance mechanism currently used by Motiva for the biosludge landfarm is the corporate guarantee as described in LAC 33:VII.727. Financial Assurance Documentation is included as Appendix X.

M. Special Requirements

The administrative authority may require additional information for special processes or systems and for supplementary environmental analysis.

Motiva acknowledges that the administrative authority may require additional information for special processes or systems and for supplementary environmental analysis.

PART III: ADDITIONAL SUPPLEMENTARY INFORMATION (LAC33:VII.523)

The following supplementary information is required for all solid waste processing and disposal facilities. All responses and exhibits must be identified in the following sequence to facilitate the evaluation:

This Solid Waste Permit Renewal Application addresses an existing biosludge landfarm at the Motiva Enterprises LLC – Convent Refinery, St. James Parish. The biosludge landfarm is located on approximately 15 acres where biosludge is applied onto the biosludge landfarm in the form of a wet sludge. The wastes are then degraded by microorganisms. Once degraded, the wastes in the land treatment unit have the physical consistency of surface soils.

The potential adverse environmental effects from the biosludge landfarm include groundwater and surface water impacts. There are no air emissions from the biosludge landfarm that could endanger local residents or other living organisms. Additionally, the levee system, clay liner, leachate collection system, groundwater protection system, and the application process prevent wastes from coming into contact with soils outside of the biosludge landfarm. Finally, the biosludge landfarm is located within the facility boundaries of the Convent Refinery. Therefore, no food chain crops will be grown on the soils in the biosludge landfarm and no livestock will be allowed to graze within the unit. Therefore, there will be no pathway for the release of constituents into the food chain that could endanger local residents or other living organisms.

Surface water impacts will be avoided by isolating wastes from any contact with surface waters. The biosludge landfarm is surrounded by a system of dikes designed to contain rainfall run-on and run-off. Any stormwater collected from the landfarm is routed to the refinery wastewater treatment system and discharged through a permitted outfall.

The bottom and sides of the landfarm are lined with four feet of recompacted clay that at construction had a coefficient of permeability no greater than 10^{-7} cm/sec. There is an additional approximate three feet of silty clay (treatment zone) on top of the recompacted clay. The leachate collection system consists of the new leachate collection system including perforated lateral lines directed to a sump connected to the refinery Waste Water Treatment System. These measures are designed to prevent the spread of constituents to subsurface soils and groundwater. In addition, there is a groundwater monitoring system in place around the biosludge landfarm to detect any possible migration of sub-surface contamination into the surrounding groundwater. Sampling of the groundwater monitoring wells around the landfarm shows that there has been no contamination of the groundwater from the landfarm. If contamination of groundwater from the biosludge landfarm is detected and confirmed, Motiva will comply with the corrective action requirements of LAC 33:VII.709.E.9.

The precautions above protect against releases to either surface or sub-surface waters that could endanger local residents or other living organisms. There are no real adverse long-term environmental impacts associated with the biosludge landfarm. There has been no release of constituents from the biosludge landfarm. The design

requirements and operational procedures of the landfarm ensure that no adverse environmental impacts will occur in the future.

A. Have the potential and real adverse environmental effects of the proposed facility been avoided to the maximum extent possible?

This application does not propose a new facility. This application is a permit renewal application for the existing, previously permitted biosludge landfarm, a solid waste landfarm located at the Motiva Enterprises LLC - Convent Refinery (Motiva). The design of this unit is in compliance with applicable State and Federal regulations. Continued operation of the biosludge landfarm in accordance with these strict standards assures that the potential and real adverse environmental effects have been avoided to the extent possible.

The biosludge landfarm receives biosludge, a non-hazardous solid waste from the refinery wastewater treatment system. The biosludge landfarm is designed to receive less than two inches of wet biosludge per week per acre or the dry weight equivalent. Biosludge is applied onto the biosludge landfarm in the form of a wet sludge. The biosludge is then degraded by microorganisms. Once degraded, the biosludge in the land treatment unit has the physical consistency of surface soils. When Motiva decides to close the biosludge landfarm, the unit will be closed and placed under post-closure care in accordance with Federal and State Regulatory requirements.

The potential adverse environmental effects from the biosludge landfarm include groundwater and surface water impacts. There are no volatile organic compound air emissions from the biosludge landfarm that could endanger local residents or other living organisms. Additionally, The levee system, clay liner, leachate collection system, groundwater protection system, and the application process prevent wastes from coming into contact with soils outside of the biosludge landfarm. Finally, the biosludge landfarm is located within the facility boundaries of the Convent Refinery. Therefore, no food chain crops will be grown on the soils in the biosludge landfarm and no livestock will be allowed to graze within the unit. Therefore, there will be no pathway for the release of constituents into the food chain that could endanger local residents or other living organisms.

Surface water impacts will be avoided by isolating wastes from any contact with surface waters. The biosludge landfarm is surrounded by a system of dikes designed to contain rainfall run-on and run-off. Leachate and surface runoff will be collected and returned to either the facility wastewater treatment for discharge through permitted discharge point or discharged directly to an approved discharge point.

The bottom and sides of the landfarm are lined with four feet of recompacted clay that at construction had a coefficient of permeability no greater than 10^{-7} cm/sec. A leachate collection system is in place in the biosludge landfarm to collect any leachate from the unit. These measures are designed to prevent the spread of constituents to subsurface soils and groundwater. In addition, there is a groundwater monitoring system in place around the biosludge landfarm to detect any possible migration of sub-surface contamination into the surrounding groundwater. Sampling of the groundwater monitoring wells around the landfarm shows that there has been no evidence of adverse impact to the groundwater from the landfarm. If groundwater monitoring efforts detect and confirm that constituents of concern are present in the groundwater from the biosludge landfarm, Motiva will comply with the corrective action requirements of LAC 33:VII.709.E.9.

The precautions above protect against releases to either surface or sub-surface waters that could endanger local residents or other living organisms. Based on existing data, there are no real adverse long-term environmental impacts associated with the biosludge landfarm. The design requirements and operational procedures of the landfarm minimize the potential for adverse environmental impacts will occur in the future.

B. Does a cost benefit analysis of the environmental impact costs balanced against the social and economic benefits of the proposed facility demonstrate that the latter outweighs the former?

As detailed in the response to LAC 33:VII.523.A, there are no adverse environmental impact costs associated with the continued operation of the biosludge landfarm. Because this permit renewal application addresses an existing unit, there will be neither positive nor negative economic effects associated with this application. The biosludge landfarm was constructed as an integral part of the Convent Refinery's waste management program.

Construction of the existing biosludge landfarm was necessitated by changes in State and Federal Regulations that required the closure of the refinery's injection wells by January 1991. Sour water that was previously disposed of by deepwell injection is now treated in the facility's wastewater treatment system. This additional wastewater stream increased wastewater loading such that biosludge production was increased by over two hundred percent, requiring the construction of a new biosludge landfarm.

The biosludge landfarm is an existing unit. The continued operation of this unit will not create any new permanent jobs. Therefore, there will be no positive economic effect on the local community.

There have been no negative effects on local property values associated with the operation of this unit and no future effects are anticipated. Since, the biosludge landfarm is an existing unit within a petroleum refinery, there will be no increased costs for police or fire protection, medical facilities, schools, or roads

associated with this permit renewal application. Finally, the isolated nature of the wastes in the unit, and their existence within an operational petroleum refinery all indicate that there will be no impact on any future economic development of the area.

C. Are there alternative projects which would offer more protection to the environment than the proposed facility without unduly curtailing nonenvironmental benefits?

This application is for the renewal of the solid waste permit for the biosludge landfarm. There is no new proposed facility associated with this application. As detailed in the response to LAC 33:VII.523.A, the design and the operating requirements for the biosludge landfarm are protective of human health and the environment.

Landfarming to biodegrade biosludge is a proven technology that both the LDEQ and USEPA deem as an appropriate method for disposing of biosludge. Landfarming has been used to treat and dispose of organic materials for years. There are many solid waste landfarms in operation throughout the United States. The design of this unit is in compliance with applicable State and Federal regulations. Continued operation of the biosludge landfarm in accordance with these strict standards assures that the potential and real adverse environmental effects have been avoided to the extent possible.

The primary method of placing biosludge onto the biosludge landfarm is through a dedicated system of piping. When the biosludge reaches the landfarm, it is applied to the surface by spray application. Alternatively, biosludge may be dewatered and spread over the surface of the landfarm. Once placed into the landfarm, the biosludge is degraded by microorganisms in the soil.

The Convent Refinery has successfully used landfarming as a disposal technique for many years. Based on this experience, the biosludge landfarm is a reliable and effective method for handling biosludges.

One alternative to continued use of the biosludge landfarm would be to ship the waste offsite for disposal at a commercial landfarm or solid waste landfill. Shipment to a commercial landfarm or landfill would entail shipping large amounts of biosludges over local and state roads, thereby increasing traffic and creating the risk of a spill should an accident occur. A commercial landfarm would perform the same biodegradation operations that are carried out at the biosludge landfarm, therefore no additional environmental benefits would be gained. The option of shipping the wastes to a solid waste landfill would entail the waste being buried without the benefit of biodegradation, thereby increasing both the mass of material disposed and the concentration of any constituents. In addition, commercial landfill and landfarm space is limited. The onsite disposal of these wastes in the biosludge landfarm does not use any of this valuable capacity. In addition, this method of disposal would be more expensive than onsite disposal.

The increased economic and environmental costs of off-site disposal, combined with the fact that the technology currently being used is protective to human health and the environment, make the alternative of commercial disposal less desirable.

D. Are there alternative sites which would offer more protection to the environment than the proposed facility site without unduly curtailing nonenvironmental benefits?

This permit renewal application is for an existing unit, the biosludge landfarm. Therefore, there are no siting criteria associated with this application. There are no sites that would offer more protection to the environment than the existing site without unduly curtailing non-environmental benefits.

The biosludge landfarm is an operating, integral part of the Convent Refinery's waste management system. Should the LDEQ deny this permit renewal application, the Convent Refinery would have to find an alternative means of handling biosludge. As detailed in the responses to the cost benefit analysis section, this would increase both economical and environmental costs.

A letter from the U.S. Army Corps of Engineers states that the biosludge landfarm is not located in a wetland. The Convent Refinery is also not located in an estuary. An inquiry was made to the Louisiana Department of Wildlife and Fisheries requesting information on any critical habitats in or near the biosludge landfarm. The Louisiana Department of Wildlife and Fisheries concluded that there was an eagle nest recorded in the surrounding area. However, this Department concluded that facility activities would not have an adverse impact to this critical habitat.

An inquiry was made to the Louisiana Department of Culture, Recreation, and Tourism requesting information concerning historically or culturally significant areas in or near the biosludge landfarm. The State Historic Preservation Officer of the Office of Cultural Development in the Department of Culture, Recreation, and Tourism stated that there are two archaeological sites located within 1,000 feet of the facility. However, the Preservation Officer stated that the biosludge landfarm will have no adverse impact to these sites.

The existing site is not located in a 100-year flood zone based on the Flood Insurance Rate Map for Ascension and St. James Parishes, Louisiana. Panel 25 of this map indicates that the biosludge landfarm is located in Zone C, which is not a 100-year flood area. Additionally, the elevation of the Convent Refinery varies from a low point of two feet above mean sea level (msl) to a high point of 20 feet above msl.

The site is hurricane vulnerable due to its location in Louisiana. However an independent consultant conducted a study of the effects of hurricane storm surges on the Convent Refinery and concluded that the Convent Refinery was not subject to flooding due to hurricane storm surges. The Convent Refinery is

not located near any large body of water that would generate wave action from hurricanes. The closest large body of water is Lake Maurepas, located approximately twenty miles away. The refinery is located on the Mississippi River and the biosludge landfarm is over a mile away from the river levee. Even if high winds caused waves to top the levee, the distance of the biosludge landfarm from the levee would assure that no wave action would reach the unit.

Groundwater monitoring wells have been placed adjacent to the biosludge landfarm and are regularly sampled and analyzed to demonstrate proper performance of the unit. Recent data from refinery groundwater monitoring wells screened in a zone approximately 15 ft-bgs indicated horizontal ground water flow rates ranging from 0.065 ft/year to 0.143 ft/year. The groundwater flow is primarily to the southeast, away from the Mississippi River.

The first water bearing zone beneath the biosludge landfarm area starts approximately 12 to 15 feet below the ground surface (ft bgs). This water-bearing zone is not potable.

The first potable aquifer is located at a depth starting at approximately 100 ft bgs and is not hydraulically connected to the first potable aquifer. Other deeper aquifers are the Alluvial Aquifer, which ranges from 175 to 425 ft bgs and the Gonzales, New Orleans Aquifer, which ranges from approximately 520 to 700 ft bgs.

It should be noted that the continued operation of the biosludge landfarm does not pose potential health risks to any sensitive areas or receptor populations. The area surrounding the Convent Refinery is primarily used for agricultural purposes and is not heavily residential and there are no schools, day care centers, hospitals, prisons, public buildings, entertainment facilities, or food storage areas within two miles of the biosludge landfarm. These agricultural uses are primarily sugar cane farming and cattle grazing. These operations will not be affected by the continued operation of the biosludge landfarm. The operating conditions for the biosludge landfarm are protective of human health in the vicinity of the facility.

The Convent Refinery is located in St. James Parish which is currently designated as an ozone attainment area. The wastes placed in the biosludge landfarm do not have the potential to produce gas that might migrate and have a significant adverse impact on human health or the environment. Since there will be negligible emissions from the unit, no odor controlling measures are required for the landfarm.

This application is for the renewal of a solid waste permit for the biosludge landfarm, a pre-existing operating unit. A new physical site is not being considered for this facility. Physical site characteristics were studied by the Convent Refinery and approved by the administrative authority before the original solid waste operating permit for the biosludge landfarm was issued.

The Convent Refinery site resides in the Mississippi Alluvial Valley which is a deltaic plain. The Natural levees were created by the deposition of sediment during periods of Mississippi River overflowing. The levees are highest near the river and generally slope away toward the back of the site. The refinery property slopes gently from an elevation of about 20 feet above mean sea level (msl) along the river bank to an elevation of about 2 feet msl, two miles from the river. Directly north of the refinery is an upland region which slopes southwards and ends near the St. James Parish Boundary.

E. Are there mitigating measures which would offer more protection to the environment than the facility as proposed without unduly curtailing nonenvironmental benefits?

The biosludge landfarm design complies with all State and Federal Regulations governing solid waste landfarms. There are no additional mitigating factors that have been identified that would offer more protection to the environment than the facility as proposed without unduly curtailing nonenvironmental benefits. These requirements include:

- a perimeter levee system to prevent migration of the biosludges from the unit;
- a four foot thick layer of recompacted clay under the zone of incorporation;
- an additional three feet of silty clay provided for added protection;
- a leachate collection system to prevent any free liquids from accumulating in the bottom of the unit;
- a groundwater monitoring system designed to detect any release of constituents from the unit before any such contamination can move either off-site or into surrounding groundwater aquifers; and
- placement of a spray distribution system such that the spray application of the biosludge remains within the boundaries of the landfarm.

The biosludge landfarm was designed as an integral part of the Convent Refinery's on-site facility waste management plan. The biosludge landfarm provides an end-point disposal destination for wastes generated by the facility's wastewater treatment system. The biosludge landfarm only serves the Convent Refinery. The dedicated nature of this waste stream ensures that no off-spec wastes will be placed in the unit and that no wastes will be rejected. Waste minimization, recovery, and recycling are all part of the facility's overall waste management plan.

Alternatively, the biosludges treated and disposed of in the biosludge landfarm can be disposed by either offsite commercial landfarming or landfilling. There would be cost increases associated with either of these methods. In addition, using either of these alternative methods would not increase environmental protection but would instead entail increased environmental costs.

TABLE 1
WELL DATA

DOTD Well No.	Well Owner	Well Use
5139Z	STAR ENTERPRISE	PIEZOMETER
5483Z	MOTIVA ENTERPRISE	PLUGGED
5484Z	MOTIVA ENTERPRISE	PLUGGED
5485Z	MOTIVA ENTERPRISE	PLUGGED
5486Z	MOTIVA ENTERPRISE	PLUGGED
5487Z	MOTIVA ENTERPRISE	PIEZOMETER
5488Z	MOTIVA ENTERPRISE	PIEZOMETER
5489Z	MOTIVA ENTERPRISE	PLUGGED
5490Z	MOTIVA ENTERPRISE	PLUGGED
5491Z	MOTIVA ENTERPRISE	PLUGGED
5492Z	MOTIVA ENTERPRISE	PLUGGED
5493Z	MOTIVA ENTERPRISE	PLUGGED
5494Z	MOTIVA ENTERPRISE	PLUGGED
5495Z	MOTIVA ENTERPRISE	PLUGGED
5496Z	MOTIVA ENTERPRISE	PLUGGED
5497Z	MOTIVA ENTERPRISE	PLUGGED
5469Z	STAR ENTERPRISE	PLUGGED
5470Z	STAR ENTERPRISE	PLUGGED
5471Z	STAR ENTERPRISE	PLUGGED
5472Z	STAR ENTERPRISE	PLUGGED
5473Z	STAR ENTERPRISE	PLUGGED
5474Z	STAR ENTERPRISE	PLUGGED
5475Z	STAR ENTERPRISE	PLUGGED
5141Z	STAR ENTERPRISE	PIEZOMETER
5105Z	TEXACO	MONITOR
5108Z	TEXACO	MONITOR
5140Z	TEXACO	PIEZOMETER
5142Z	TEXACO	PIEZOMETER
5143Z	TEXACO	PIEZOMETER
5259Z	STAR ENTERPRISE	MONITOR
5262Z	STAR ENTERPRISE	RECOVERY
215	AIR PRODUCTS	PLUGGED
5014Z	LA POWER & LIGHT	DOMESTIC
5138Z	STAR ENTERPRISE	PIEZOMETER
5106Z	TEXACO	MONITOR
5107Z	TEXACO	MONITOR
5449Z	STAR ENTERPRISE	MONITOR
5428Z	STAR ENTERPRISE	PLUGGED
5429Z	STAR ENTERPRISE	MONITOR
5116Z	STAR ENTERPRISE	PLUGGED
155	SOUTHDOWN INC	ABANDONED

TABLE 2
BIOSLUDGE LANDFARM GROUNDWATER
QUALITY DATA

BASELINE DATA - JANUARY 1992

Monitoring well no.	pH std units	Spec Cond (µmhos/cm)	Potent. Surf. (ft. NGVD)	TDS mg/l	TKN mg/l	Chloride mg/l	Zinc mg/l	Lead mg/l	Chromium mg/l	Nickel mg/l	Ethylbenzene µg/l	Xylene µg/l
SW*-17												
First	7.2	2600	4.07	1450	1.3	325	0.01	<0.1	<0.05	<0.05	<5.0	<5.0
Second	6.92	1470	3.83	915	<1.0	97.5	0.02	<0.005	<0.01	<0.05	<10.0	<10.0
Third	6.89	1477	3.57	1010	<1.0	79	0.16	<0.005	0.01	0.08	<10.0	<10.0
Fourth	6.77	1380	3.30	975	1.8	59	0.05	0.006	0.01	<0.05	<1.0	<1.0
AVERAGE	6.95	1731.8	3.69	1087.5	1.03#	140.1	0.06	0.028#	0.01#	0.04#	3.14#	3.14#
SW*-18												
First	7.4	2600	3.33	1540	1.2	322	0.03	<0.1	<0.05	<0.05	<5.0	<5.0
Second	6.93	1418	3.61	870	<1.0	52.5	0.02	<0.005	<0.01	<0.05	<10.0	<10.0
Third	6.89	1430	2.33	980	<1.0	42	0.31	0.084	0.11	0.13	<10.0	<10.0
Fourth	7.07	1330	3.19	502	1.7	35	0.11	0.011	0.02	<0.05	<1.0	<1.0
AVERAGE	7.07	1694.5	3.12	973	0.75#	112.9	0.12	0.049#	0.04#	0.05#	3.14#	3.14#
SW*-19												
First	7.4	2600	3.18	1250	<1.0	200	0.01	<0.1	<0.05	<0.05	<5.0	<5.0
Second	6.77	1129	3.62	669	<1.0	80	0.04	<0.005	0.02	<0.05	<10.0	<10.0
Third	6.86	946	2.71	586	<1.0	40	0.05	0.006	0.01	0.06	<10.0	<10.0
Fourth	6.76	818	2.74	756	<1.0	21	0.03	<0.005	0.01	<0.05	<1.0	<1.0
AVERAGE	6.95	1373.3	3.06	815.3	0.5#	85.3	0.03	0.015#	0.01#	0.03#	3.14#	3.14#
SW*-20												
First	7.6	2600	6.95	1660	<1.0	378	0.03	<0.1	<0.05	<0.05	<5.0	<5.0
Second	6.74	1301	6.82	692	<1.0	50	0.13	<0.005	0.03	<0.05	<10.0	<10.0
Third	6.84	1299	4.65	760	<1.0	29.5	0.02	<0.005	0.01	<0.05	<10.0	<10.0
Fourth	6.56	1219	5.53	760	1.6	15	0.05	0.006	0.01	<0.05	<1.0	<1.0
AVERAGE	6.94	1604.8	5.99	968	0.78#	118.1	0.06	0.015#	0.01#	0.03#	3.14#	3.14#

In order to calculate baseline averages, data that was below detection limit was averaged as one-half of the respective detection limit.

* SW-17, 18, 19, and 20 are the current monitoring well designations; however, were reported in the four quarterly reports as MW-17, 18, 19, and 20.

std units = standard units

Spec Cond = Specific Conductance

TKN = Total Kjeldahl Nitrogen

TDS = Total Dissolved Solids

Potent. Surf. = Potentiometric Surface